

NAVAL SAFETY CENTER
NAVAL AIR STATION
NORFOLK, VIRGINIA 23511

161/gr
Ser 1445
25 October 1968

SPECIAL HANDLING REQUIRED IAW OPNAVINST 3750.6 SERIES
FOR OFFICIAL USE ONLY

From: Commander, Naval Safety Center
To: Commanding Officer, Marine Medium Helicopter Training Squadron
THREE ZERO TWO

Subj: HMMT-302 AAR ser 1-69A concerning CH-46D BuNo 153343 accident
occurring 2 July 1968, pilot BAGWELL

1. The subject report and all endorsements have been reviewed. Concur with the comments and recommendations of the Aircraft Accident Board as modified by subsequent endorsers.

2. The cause factors contributing to this accident have been recorded as follows:

*a. OTHER PERSONNEL--SUPERVISORY (factory level--produced a defective rotor blade).

b. OTHER PERSONNEL--SUPERVISORY (NAVAIREWORKFAC level--failed to remove defective rotor blade from supply system; squadron level--improper inspection cycle for rotor blade).

*Primary

(b) (6)

By direction

Copy to:
CMC (AAP)
NAVAIRSYSCOMHQ (AIR 09E) (2)
COMNAVAIRPAC
CGFMFPAC
CGTHIRDMAW
CO MHTG-30
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NAVAL SAFETY CENTER
NAVAL AIR STATION
NORFOLK, VIRGINIA 23511

60/we
16 August 1968

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6F

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NAVSAFECEN INVESTIGATION 1-69

Ref: (a) H-46 Interim Airframe Bulletin No. 103 Rev B of 11 Sep 1967
(b) NAVAIREWORKFAC North Island msg 080422Z Jul 1968
(c) NAVAIRSYSCOMHQ msg 121913Z Jul 1968

1. INTRODUCTION

a. The Accident. CH-46D, BUNO 153343, assigned to MARINE MEDIUM HELICOPTER TRAINING SQUADRON THREE ZERO TWO (HMMT-302) crashed in the Black Star Canyon of Orange County, located 350 degrees, 8 miles from MCAS El Toro, California Tacan. The accident occurred about 2025(T) on 2 July 1968 and the aircraft was destroyed (ALFA) upon impact. The pilot, MAJ Larry L. BAGWELL, USMC, (b) (6) age 34, and the crew chief, CPL Gale D. ABRAMS, USMC, (b) (6) age 23, were fatally injured. The copilot, 1ST LT (b) (6) age 24, received major injuries. There was negligible damage to private property.

b. Synopsis of Flight. CH-46D, BUNO 153343, departed Marine Corps Air Facility (MCAF) Santa Ana, California, at 1830(T) and flew a one hour, 30 minute local familiarization flight, refueled at 2000(T) and again departed MCAF Santa Ana for rough area landing site number 3 located in the foothills of the Santa Ana Mountains 8 miles north of MCAS El Toro. Having made three successful left hand approaches and landings to site number 3, a right hand approach was executed. While approaching the 90 degree position, an aft rotor blade failed, followed by aft rotor separation and nose pitch up. The aircraft impacted tail first and came to rest on its port side.

2. INVESTIGATION AND ANALYSIS

a. History

(1) Pilot. MAJ BAGWELL entered the Marine Corps on 8 February 1956 and was designated a Naval Aviator on 17 July 1957. He was designated a Helicopter Aircraft Commander (HAC) in the CH-46D on 28 December 1966. MAJ BAGWELL had a total of 3366 flight hours of which 1492 were in helicopters,

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Enclosure (1)

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including 442 hours in the H-46. Other helicopter experience included 1 hour in the HOK and 1049 hours in the H-34.

(2) Copilot. 1ST LT (b) (6) entered the Marine Corps on 30 December 1965 and was designated a Naval Aviator on 19 March 1968. He has a total of 277 flight hours of which 134 hours were in helicopters, including 71 hours in the H-46. Other helicopter experience included 20 hours in the TH-13M and 48 hours in the H-34.

(3) Crew Chief. CPL ABRAMS qualified as a H-46 crew chief on 16 November 1967 and had 145 flight hours experience.

(4) Aircraft. CH-46D, BUNO 153343, was accepted by the Navy on 11 January 1967 and had accumulated 565 hours since acceptance. The aircraft had flown 25 hours since the 5th calendar inspection on 8 April 1968.

(5) Engines. The T58-10 engines, serial numbers GE-E218078 (port) and GE-E281198 (starboard) were not a factor in this accident.

MODEL	GE-T58-10	GE-T58-10
SERIAL	GE-E281078	GE-E281198
DATE ACCEPTED	10 May 1966	20 Sep 1966
OP HRS SINCE ACCEPT	620.0	495.8
TYPE OF CHECK	2nd Cal Odd	1st Cal Even
DATE OF CHECK	24 Apr 1968	1 May 1968
HRS SINCE CHECK	24.8	24.8
DATE INSTALLED ON ACFT	26 Apr 1968	3 May 1968

(6) Weather. Weather was not a factor in this accident.

(7) Aft Rotor Blades

MODEL	AO2R	1502-2	
SERIAL NUMBER	A2-161	A2-716	A2-668
HRS SINCE ACCEPTANCE	426	310	102.7
NUMBER OF OVERHAULS	None	None	None

b. Field Investigation

(1) The Naval Safety Center (NAVSAFECEN) investigator was assisted in the field by Mr. I. Senderoff of Boeing-Vertol Aircraft Company.

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(2) The main fuselage wreckage was located 010 degrees, 1150 feet from the proposed landing site. The aircraft was traveling on an easterly heading, impacted the ground tail first and came to rest on its port side heading northwest with no forward motion after impact. The fuselage forward of FS 290 was virtually intact. The number 4 and 5 synchronization shafts were bent in a "V" and driven three feet into hard packed dirt.

(3) The engines and accessories, transmission, and gear box were destroyed by fire at the impact point.

(4) The aft rotor and pylon separated at W.L. station 71 and came to rest 265 degrees, 130 feet from the fuselage area.

(5) Numerous pieces of blades were scattered over the mountain sides as far as three-fourths of a mile.

(6) The aft rotor blade actuators were measured and found to be in a hover aft position. The hover aft switch in the cockpit verified this condition.

(7) The aft yellow rotor blade, model A02R 1502-2, serial number A2-668, D-shaped spar, which was not ultrasonically tested, failed in fatigue in the 15th pocket area, 15.75 inches outboard from the incidence setting line. The half-moon nugget origin depth was about 31 percent of the spar cross section wall thickness and measured about .078 inches in width. This nugget is located approximately two inches forward from the center of the heel point radius on the upper portion of the spar. The fatigued zone measures approximately five and one-half inches in length with stop mark indications.

(8) Reference (a) requires that this blade be x-rayed or eddy current inspected every 12.5 flight hours. The aft yellow blade was last inspected by eddy current with 80.7 flight hours recorded. At time of blade failure, the blade was flown an additional 22 hours and was 9.5 hours overdue for an inspection.

(9) The inboard portion of the failed blade was found about four feet from the aft rotor pylon section while the outboard portion of the failed blade was located approximately 3900 feet from the aft rotor pylon on top of a hill 300 feet higher than the crash site.

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(10) The copilot, on his next to last syllabus flight, was at the controls when the blade failed and the nose began to pitch up. At this time the pilot took control but was unable to improve the situation.

(11) As the fuselage landed on the port side, both pilot and copilot seats failed in shear where they attach to the cockpit deck. This resulted in the pilot being hit on his left side by the cockpit bulkhead while the copilot came down striking the right side of the pilot.

c. Disassembly Inspection. Naval Air Rework Facility (NAVAIREWORKFAC) North Island, California, performed a metallurgical examination of the suspected aft rotor blade, model A02R 1502-2, serial number A2-668 that revealed a fatigue type failure initiated by a manufacturing defect in the form of a notch type deep surface lap in the blade spar.

d. Other Investigation

(1) NAVAIREWORKFAC North Island took x-rays of the aft yellow failed blade in September 1967. Initial reading and evaluation of the x-ray indicated a suspected flaw and an x-ray retake of the spar was requested. The second x-ray was examined and evaluated which resulted in accepting the blade as satisfactory for fleet use.

(2) A blade failure identical to subject blade failure was experienced and caused a CH-46 accident that occurred on 30 June 1967.

e. Sequence of Events

(1) A fabrication induced surface defect in the form of a notch type deep surface lap was introduced during the manufacturing of the blade spar.

(2) X-raying the failed spar, measuring the surface lap failure, locating and comparing this to the x-ray taken in September 1967 revealed the flaw to be the same that was initially suspected but subsequently passed.

(3) The eddy current inspection of the failed blade was 9.5 hours overdue.

(4) The location of the fatigued zone was located on the spar where an eddy current inspection should detect its presence.

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(5) The presence of stop marks in the fatigued zone indicate that fatigue failure was occurring. If propagation rate can be fairly well approximated, it is likely that an eddy current inspection within the prescribed 12.5 hour cycle limits could have detected the inevitable failure.

(6) The aft rotor blade failed in flight causing an unbalance and desynchronization of the aft rotor head. This resulted in blade interference and unbalanced loads severe enough to tear the aft rotor pylon from the fuselage.

(7) Final lateral impact forces caused the pilot and copilot seats to shear from their deck mounted supports. Had these seat mounts not failed, it is likely the pilot would not have sustained fatal injuries.

3. CONCLUSIONS. The most probable cause of this accident was fatigue failure of an aft rotor blade. The cause of the fatigue failure was initiated by a manufacturing defect in the form of a notch type deep surface lap in the blade spar.

4. ACTION COMPLETED

a. Reference (b) stresses the importance of contractor inspection procedures for the detection of material defects in CH-46 rotor blade spars.

b. Reference (c) stresses the importance and strict compliance with inspection criteria and intervals prescribed in H-46 Interim Airframe Bulletin 103, Revision B. Additionally, any blade that reveals evidence of physical damage should be inspected.

5. RECOMMENDATIONS. It is recommended that Naval Air Systems Command Headquarters review and reevaluate the current lateral G loading capabilities and requirements for the pilot and copilot seat deck mounts in the H-46 and other fleet operating helicopters. These G loads should be in excess of what medical experts say that a human can be expected to withstand.

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DEPARTMENTAL COMMENTS FOR "CLOSE OUT" LETTER
ON ORIGINAL REVIEW

- NOTE:
1. Negative report is required.
 2. Positive comments will be in a format suitable for inclusion in the "close out" letter.
 3. Attach additional sheets if more space is required.

M&M DEPARTMENT:

Concur with the conclusion and finding of the
Accident Board. *231C NR*
and rough close out letter as written +

9/23/

INITIAL/CODE

AERO-MED DEPARTMENT:

No Specific Aeronautical Comment

8/22

INITIAL/CODE

COMPLETION SHEET

Action to: Correction to	Action Required	Completed Code/Date
3750-1		/
DIR		/
Misc Items for Action or Correction		
To Code	From Code/Date	
		Hard-coded 8-26-68 H
	/	Original received 9-11-68
	/	/
	512 / 9/13/68	Not litigation per <u>Mr. Sykes</u>
511	512 / 10-21-70	Final review completed
	/	and document is ready to be
	/	closed. <i>W. J. Miller</i>
	/	/
	/	/
	/	/
	/	/
	/	/
	/	/

21 OCT 1970

CLOSED

R&DP-27(4/68)

UNIT HMMT-302
 MODEL CH46D
 BUNO 153343

AAR REVIEW ROUTING SHEET

ADVANCE ROUTING

PRI	DEPT	DATE IN	DATE OUT	INIT	INTER-DEPT	ROUTING:
	M&M		9-25-68			
	AERO-MED	9-19-68		JS	SB	see

DEPARTMENT REPRESENTATIVES INITIALS FOR RECEIPT OF REPORTS:
 REMARKS:

ORIGINAL ROUTING

11 OCT 1968

DEADLINE DATE OUT OF NAVAVNSAFECEN
 EXTENSIONS

DEPT	DATE IN	DEPT DEADLINE	DATE OUT	INIT	INTER-DEPT	ROUTING
AOA	26 Sep 68		22 Oct 68	JS		

NAVAVNSAFECEN ENDORSEMENT ROUTING

PRI	DEPT	DATE IN	DATE OUT	INIT
1	R&DP			
2	M&M			
3	ADMIN			

JS 10-30-68

ROUTING AFTER CLOSE-OUT

DEPT	DATE IN	DATE OUT	INIT	INTER-DEPT	ROUTING
AERO-MED					

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☐ REGULAR MAIL ☐ SPECIAL DELIVERY
☒ AIR MAIL ☐ REGISTERED MAIL

CLASSIFICATION

IN REPLY REFER TO

341/AJP:sjm
Ser - 3186

DATE 22 AUG 1968

TO: Naval Air Systems Command Rep., Pacific
Naval Air Station
North Island
San Diego, California 92135

NAVAL SPEEDLETTER-

Permits dispatch or informal language.

May be sent (1) with enclosures, (2) in a window envelope (size 8 1/4" x 3 1/4"), if contents are not classified as confidential or higher, (3) to both naval and nonnaval activities.

Subj: CH46D BuNo 153343 Accident Investigation

Ref: (a) NAVAIRSYSCOMREPAC msg 092129Z Jul 1968

Correction necessary in the identification of failed CH46 rotor blade subject of reference (a).

Failed rotor blade was incorrectly identified in NAVAIREWORKFAC NORIS letter serial number 2925 of 5 August 1968 and NORIS Laboratory Report 36805 of 29 July 1968 as P/N A02R1502-1, S/N A-1-573 under Control No. 2752-68.

True identification of subject blade is P/N A02R1502-2, S/N A-2-668 under Control No. 2793-68.

(b) (6)

(b) (6)

COPY TO

NAVAIRSYSCOMHQ
NAVSAFECEN
COMNAVAIRPAC
CG THIRD MAW

MCAS EL TORO
MADMEDHELTRARON THREE ZERO TWO
MARHELTRAGRU THREE ZERO
MARHEDMAINTRON THREE ZERO

ADDRESS: Commanding Officer
Naval Air Rework Facility
Naval Air Station, North Island
San Diego, California 92135

SENDER'S MAILING ADDRESS

Address reply as shown at left; or reply hereon and return in window envelope (size 8 1/4" x 3 1/4"), if not classified as confidential or higher.

CLASSIFICATION

6807021--

ENGINEERING MATERIALS LABORATORY REPORT

TO: C. Schaub

P32-24

EMLR NO.

68-246

CC:

DATE

030900Z July

SUBJECT: CH-46D Accident of Aircraft S/N 153343. Metallurgical Investigation of Failed Rotor Blade, P/N A02R1502, S/N A-2-668.

ENCLOSURES: I - VII - Photographs of Subject Part.

I. HISTORY:

During rough area landing practice, the subject aircraft crashed. The fuselage, aft of Station 370, was destroyed by fire. On-site investigation revealed that the outboard 51 inches of the subject aft rotor blade was a considerable distance from the crash impact site.

Segments of the subject rotor blade were sent to the Materials Engineering Laboratory for a complete metallurgical investigation. Total time on the blade was reported to be 102.7 hours.

II. RESULTS OF EVALUATION:

AAR
7-2-68

A. Visual Examination

Two segments of the failed spar were received for examination:

1. A 3 foot long spanwise segment containing the inboard fracture surface (Figures 1, 2, & 7). Failure occurred at blade station 24, which corresponds to 83.8 per cent of the radius.
2. The second segment was an 18 inch long spanwise section containing the outboard fracture surface. This segment was severely deformed due to apparent impact at the leading edge (Figures 3, 4, 5, and 6).

B. Macroexamination

Examination of the fracture surfaces revealed a fatigue mode of failure. Propagation initiated below the surface from a semi-circular origin located on the top outer surface of the spar, approximately 2.00 inches from the heel radius (Figure 7).

The origin was approximately .078 inch long and .021 inch deep

(Figure 8) and was oriented at approximately 10 degrees from the chordwise plane (Figure 9). The fracture surface in the origin area sloped at approximately 30 degrees from the top surface of the spar (Figure 10).

Fatigue was macroscopically observed to propagate approximately 3 inches toward the nose and 3 inches aft around the top heel radius. The remaining portion of the fracture surface (approximately 60 per cent) showed characteristics of overload failure.

After removing the zinc plate from the outer surface of the spar in the vicinity of the origin, no evidence of surface damage was apparent (Figure 9).

C. Microexamination

A longitudinal section of the spar wall through the origin confirmed the presence of a lap. Grain flow disturbance was evident throughout the thickness of the wall (Figure 10 - 11). A normal spar microstructure of hardened and tempered martensite was found in this section (Figure 12). No complete decarburization was noted and the partial decarburization was nil.

D. Dimensional Inspection

A section thickness survey of the origin area was performed and the results (.050 inch) conformed to the drawing and Boeing Document D8-0856 requirements (.050 plus .005, minus .000 inch).

E. Hardness Survey

Hardness tests indicated conformance to all drawing and specification requirements. The following hardness values were obtained:

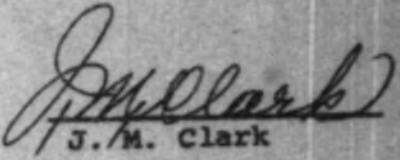
O.D. Surface:	R30N 55-57 - Required:	R30N 50-61
I.D. Surface:	R30N 53-55 - Required:	R30N 50-61
Core Hardness:	R/C 38-39 - Required:	R/C 32-39

F. Electron Fractography

Electron fractography was used to verify the location of the transition zone from fatigue to ultimate failure. Examination of the fractographs confirmed the macroscopic evaluation. The fatigue propagation extended 3 inches forward and 3 inches aft of the origin (Figure 13). Fractographs from 11 locations are shown in Figures 14 through 25.

III. CONCLUSIONS:

- A. The failure mode of the "D" spar was fatigue which propagated around 40 per cent of the periphery. The balance of the spar section displayed an ultimate mode of failure.
- B. The fracture originated from a lap at 83.8 per cent of the blade radius.
- C. The semi-circular origin was a lap oriented at a plane which intersected the top surface at an angle of 30 degrees. The lap which extended .078 inch was oriented 10 degrees from the chordwise plane. The depth of the lap was .021 inch.
- D. Microscopic examination of a longitudinal section through the origin disclosed a grain flow disturbance throughout the cross-section.
- E. The origin was dimensionally inspected for wall thickness and found to be within the drawing tolerances.
- F. The hardness, decarburization, and microstructure indicated material conformance to the drawing and processing specification requirements.
- G. Electron fractography confirmed the extent of the fatigue propagation.


J. M. Clark

EMLR 68-246
ENCLOSURE I



FIGURE 1 .1X
AS RECEIVED INBOARD SEGMENT OF THE
AFT ROTOR BLADE P/N A02R1502,
S/N A-2-668 - TOPSIDE.



FIGURE 2 .1X
INBOARD SEGMENT - BOTTOM SIDE.

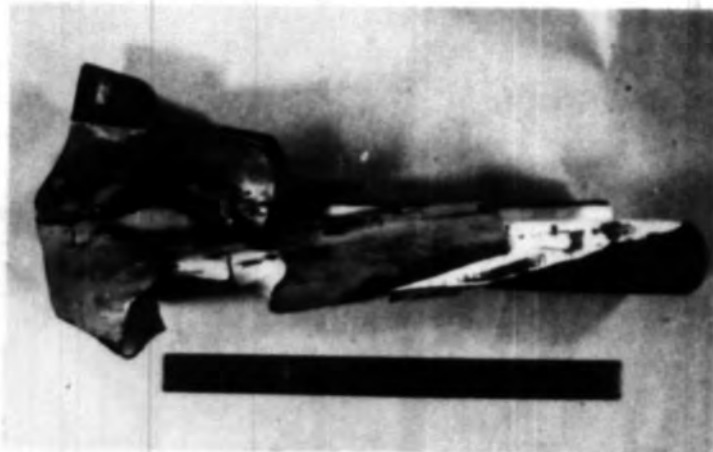


FIGURE 3 .23X
AS RECEIVED OUTBOARD SEGMENT OF
THE AFT ROTOR BLADE P/N A02R1502,
S/N A-2-668. VIEW SHOWS LEADING
EDGE AND TOPSIDE.



FIGURE 4 .23X
OUTBOARD SEGMENT VIEW SHOWS THE
BOTTOM SIDE.

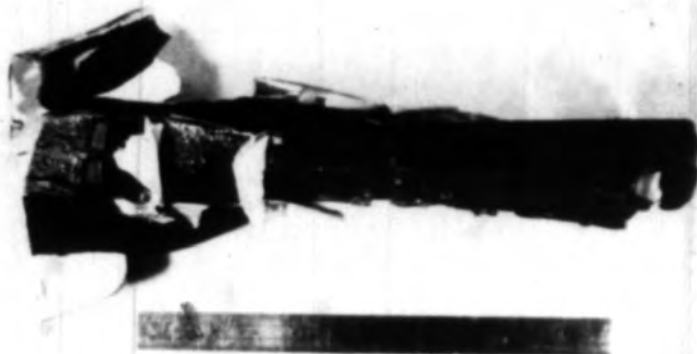


FIGURE 5 .23X
OUTBOARD SEGMENT VIEW SHOWS THE
HEEL OF THE SPAR.

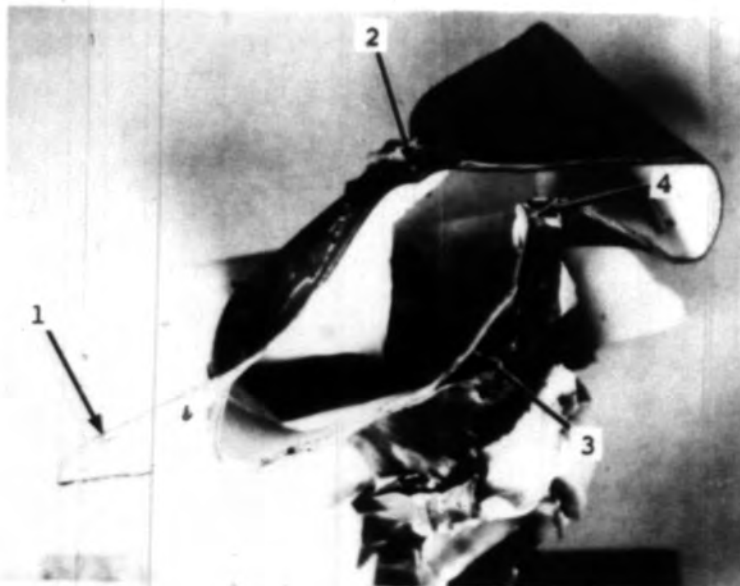


FIGURE 6 .6X
OUTBOARD SEGMENT VIEW SHOWS THE
FRACTURE SURFACE. ARROW 1 INDI-
CATES THE ORIGIN. ARROW 2 INDI-
CATES THE SPAR NOSE. ARROWS 3
AND 4 INDICATE THE HEEL AREA.

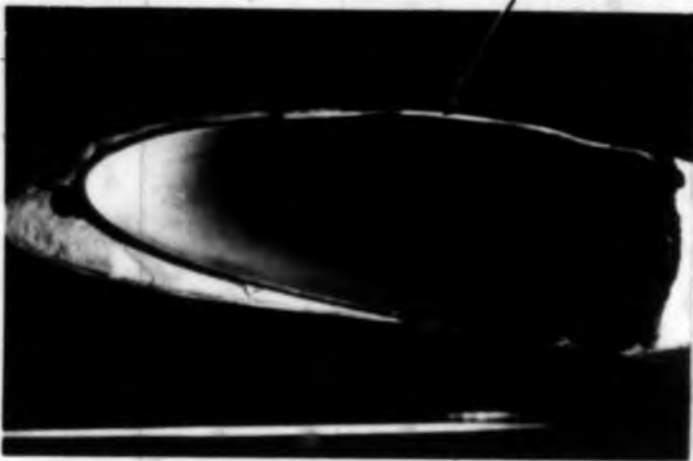


FIGURE 7 .65X
INBOARD SEGMENT - VIEW SHOWS THE
FRACTURE SURFACE. THE ARROW
INDICATES THE ORIGIN ON THE TOP
SURFACE OF THE SPAR 2 INCHES
FORWARD OF THE UPPER HEEL RADIUS.



FIGURE 8 18X
MAGNIFIED VIEW OF THE ORIGIN IN
THE OUTBOARD SEGMENT OF THE SPAR--
THE SEMI-CIRCULAR ORIGIN IS A LAP
MEASURING .078 INCH LONG AND .021
INCH DEEP.

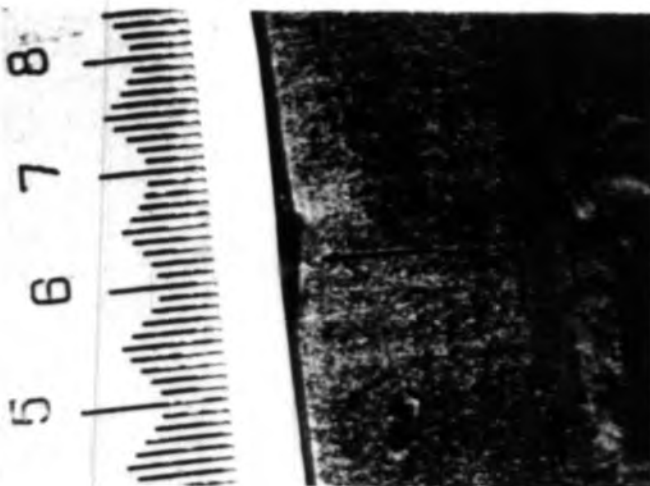


FIGURE 9 7.5X
VIEW OF THE ORIGIN IN THE OUT-
BOARD SEGMENT OF THE SPAR. VIEW
SHOWS THE OUTER SURFACE STRIPPED
OF THE ZINC PLATE. NO EVIDENCE
OF SURFACE DAMAGE WAS NOTED.

EMLR 68-246
ENCLOSURE IV

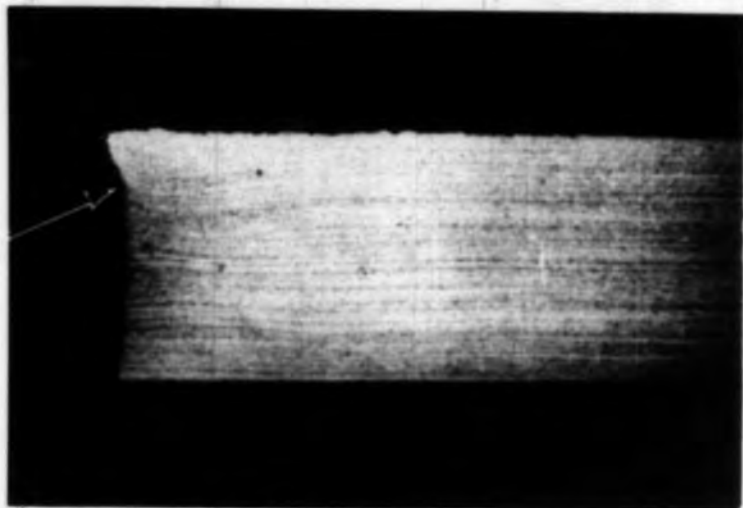


FIGURE 10: 30X
PHOTOMICROGRAPH OF A LONGITUDINAL
SECTION OF THE SPAR WALL AT THE
ORIGIN (ARROW) EXHIBITING DISTURBED
GRAIN FLOW.

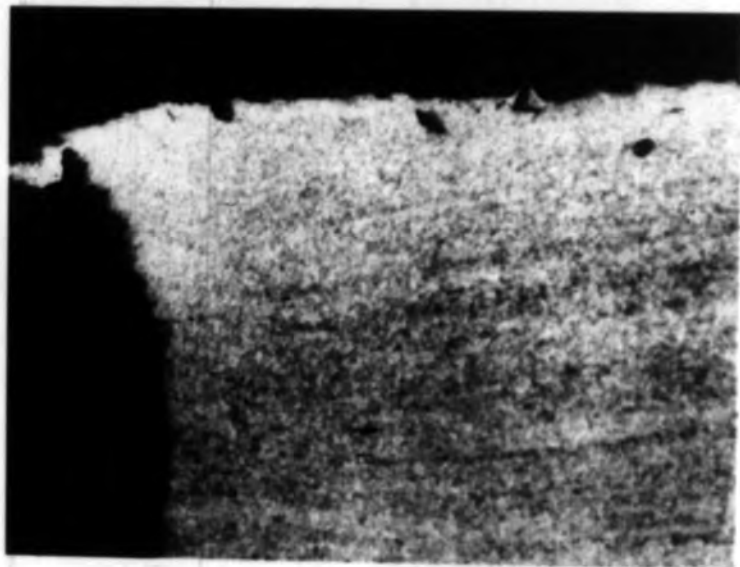


FIGURE 11 100X
CLOSE-UP OF DISTURBED GRAIN FLOW
RESULTING FROM LAP.

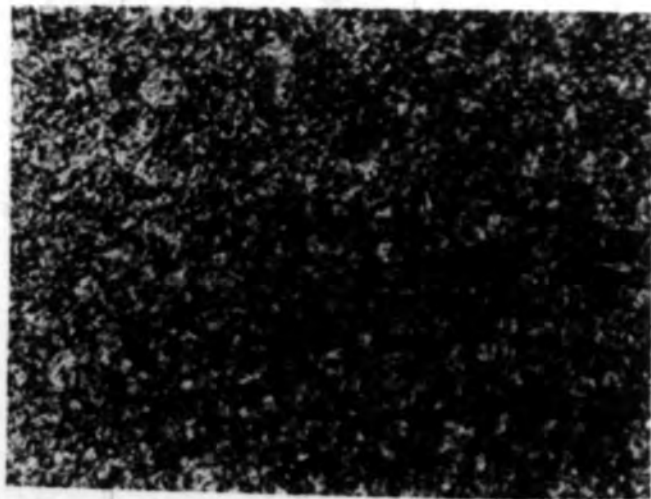


FIGURE 12 500X
PHOTOMICROGRAPH OF LONGITUDINAL
SECTION THROUGH SPAR SHOWING TYPICAL
4340 MICROSTRUCTURE.

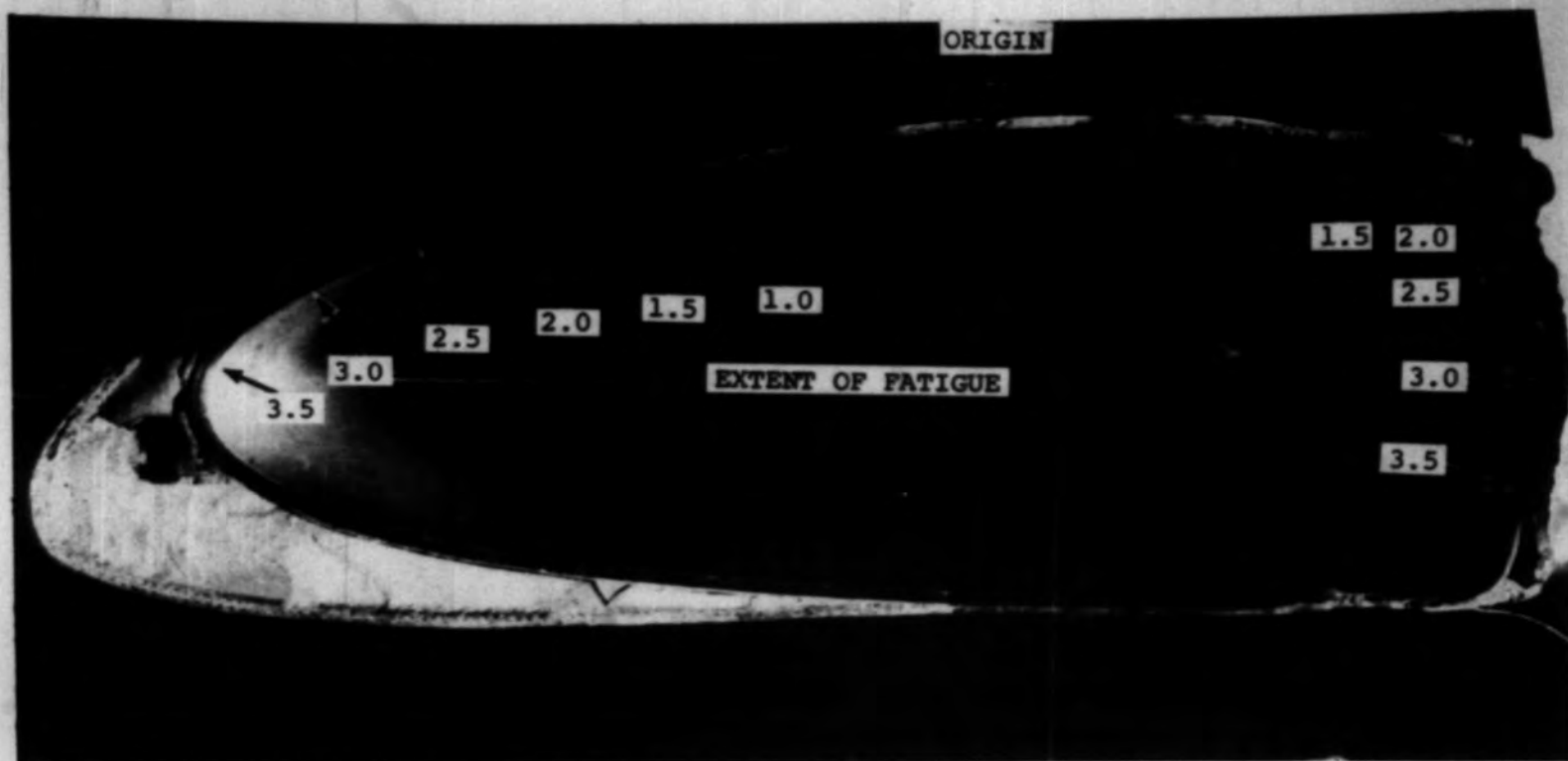


FIGURE 13

FRACTURE SURFACE SHOWING AREA ZONES REPLICATED FOR ELECTRON FRACTOGRAPHIC EXAMINATION.

THE LOCATIONS ARE DESIGNATED BY NUMERALS INDICATING THE DISTANCE IN INCHES FROM THE ORIGIN.

1.4X

E

1-246
V

ELECTRON FRACTOGRAPHIC SURVEY OF THE FRACTURE SURFACE FORWARD OF THE ORIGIN.



FIGURE 14 5,700X
FATIGUE ZONE 1.0 INCH FORWARD OF ORIGIN.



FIGURE 15 3,200X
PREDOMINANTLY FATIGUE ZONE 1.5 INCH
FORWARD OF ORIGIN.



FIGURE 16 5,700X
MIXED MODE ZONE 2.0 INCHES FWD OF ORIGIN.

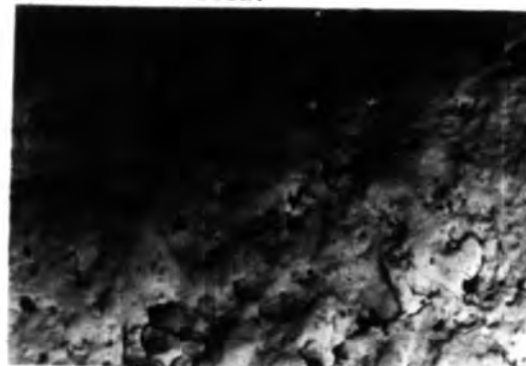


FIGURE 17 3,200X
FATIGUE ZONE 2.5 INCHES FWD OF ORIGIN.



FIGURE 18 3,200X
TENSILE OVERLOAD ZONE 3.0 INCHES FOR-
WARD OF ORIGIN.



FIGURE 19 3,200X
TENSILE OVERLOAD ZONE 3.5 INCHES FOR-
WARD OF ORIGIN.

ELECTRON FRACTOGRAPHIC SURVEY OF THE FRACTURE SURFACE APT OF THE ORIGIN



FIGURE 20 3,200X
FATIGUE ZONE 1.5 INCHES APT OF ORIGIN.



FIGURE 21 3,200X
FATIGUE AND CORROSION ZONE 2.0 INCHES
APT OF ORIGIN.



FIGURE 22 6,000X
FATIGUE ZONE 2.5 INCHES APT OF ORIGIN.



FIGURE 23 3,200 X
FATIGUE ZONE 3.0 INCHES APT OF ORIGIN.



FIGURE 24 3,200X
MIXED MODE ZONE 3.0 INCHES APT OF ORIGIN.

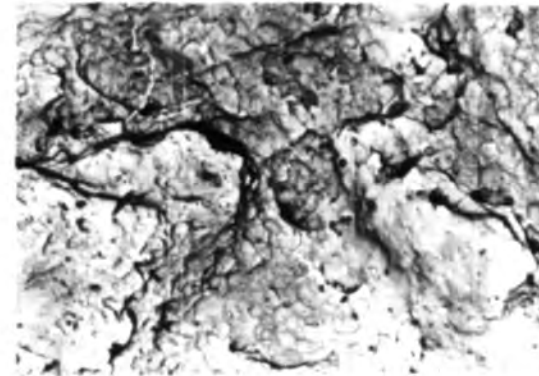


FIGURE 25 3,200X
TENSILE OVERLOAD ZONE 3.0 INCHES
APT OF ORIGIN.

See Enclosure (1)

Marine Corps Air Facility
Santa Ana, California, 92709

3 July 1968

1-68

DATE AND TIME OF INCIDENT

ON STATION

2 July 1968 2114 PDST

OFF STATION

22

REPORTING CUSTODIAN

MODEL AIRCRAFT INVOLVED

BUREAU NO.

HR71-302, MMTG-30, MCAP, Santa Ana, Calif CH-46D

153343

EXACT LOCATION OF INCIDENT

350°/8½ NM El Toro TACAN

Commander, Naval Air Systems Command (AIR-4232)

TO: Chief of Base Operations (CBO) (CSE4)

VIA MILITARY COMMAND
Commanding General, Marine Corps Air Bases, Western
Area, MCAS, El Toro, Santa Ana, California, 92709

SIGNATURE

TYPE OF INCIDENT			FIRE INVOLVED	ESTIMATED CASE
TAKE-OFF	LINE OR LOADING	FUELING	YES	22
LANDING	PARKED	MAINTENANCE	NO	
TAXIING	DEFUELING	INFLIGHT	IMPACT IGNITION (Suspected)	UNKNOWN
OTHER (Specify)			DELAYED IGNITION	

CONDITIONS AT TIME OF INCIDENT

GENERAL WEATHER PICTURE Clear, Ceiling Unlimited Visibility 10 Statute Miles	WIND DIRECTION	220°	NATURE OF TERRAIN AT AND IN APPROACH TO INCIDENT Rugged Mountain Terrain
	WIND VELOCITY (kph)	04 Kts	
	TEMPERATURE (°F)	65.0	

LIQUID FUEL QUANTITY

ESTIMATED ON BOARD BEFORE INCIDENT (lbs)	UNKNOWN
ESTIMATED ON BOARD AFTER INCIDENT (lbs)	2,100
ESTIMATED SPILL AREA (Size in feet)	110 Square Feet

OTHER FUELS

N/A

PERSONNEL RESCUE

NO. PERSONNEL ON BOARD AIRCRAFT	3	DESCRIBE RESCUE METHODS USED UNKNOWN. One injured aircrewman was rescued from the aircraft and transported approximately 20 miles to a civilian hospital by a local civilian.
NO. PERSONNEL SURVIVED	1	
NO. PERSONNEL ESCAPED UNAIDED	0	
NO. PERSONNEL RESCUED	1	

FIRE FIGHTING

FIRST METHOD OF ALARM USED			TIME RECORD	
TWO-WAY RADIO	EMERGENCY INTER-COM.	EMERGENCY PHONE	TIME ALARM RECEIVED	2117 PDST
OTHER METHOD (State)			TIME EQUIPMENT ARRIVED	2130 PDST

STATION EQUIPMENT

EACH EQUIPMENT AVAILABLE AT INCIDENT		NO. PERSONNEL MANNING EQUIPMENT		QUANTITY EXTINGUISHING AGENTS USED	
TYPE	NO. LOADS USED	MIL.	CIV.	FOAM (gals. conc. used)	OTHER TYPES AND QUANTITIES
ARSUL UNIT	0 (VIA AIR)	3			
ME-5	0	4			1 TMB Ext
ME-5	0	4			3 TMB Ext
Pick-Up		2			
5 PUMPER & 1 RESCUE VEHICLES				29 (FORESTRY DIV PER & EQUIP)	300 Gals Water

STATION EQUIPMENT OUT OF SERVICE

TYPE	DEFICIENCY	NO. OF DAYS	EXPLAIN DELAYS TO REPAIR
TANKER	Transmission	½	N/A
Pick-Up	Re-Painted	5	N/A

N/A

RECOMMENDATIONS FOR IMPROVEMENTS IN EQUIPMENT
AND/OR PROCEDURES TO INCREASE EFFICIENCY

1. That all crash officers vehicles have UHF radios installed immediately to handle rescue aircraft and support aircraft at the crash scene.
2. That more attention be giving to local fire fighting agencies in accordance with SecNavinst 11320.5 (Mutual Aid Agreement) to better facilitate rescue of personnel in down aircraft off station such as frequent aircraft check out and fire-rescue technique along with

MONETARY LOSSES (Estimated)

PERCENT DAMAGE BY IMPACT	PERCENT DAMAGE BY FIRE	LOSS TO SURROUNDING PROPERTY
Strike	60%	N/A
DATE	PREPARED BY (Name and title)	SIGNATURE
5 July 1968	(b) (6) Asst Ops Officer	
DATE		SIGNATURE
7 July 1968	K. E. HUNTINGTON	

1. All Crash & Fire Fighting equipment parked parallel to crashed aircraft on roadway. See overall view of crash area, Enclosure (3).

FULL DESCRIPTION OF FIREFIGHTING OR PROTECTION AT INCIDENT, MCAF AFRR 1-68

1. Upon notification, three (3) Crash rescuemen and an ANSUL Airlift Unit were immediately airlifted to the scene of the crash. The first A/C carried the ANSUL Unit and the second carried the Crash rescuemen.
2. Two (2) MB-5 Crash Trucks (one MB-5 from MCAS, El Toro) and one MCAF Crash Pick-Up truck departed immediately by a surface route.
3. The crashed aircraft carried a crew of three men, none of which were removed by military crash rescuemen. Upon arrival of the MCAF airborne crash rescuemen, all aircrewmembers had been removed from the crashed aircraft. An immediate search of the crash scene area was made for possible additional aircrewmembers.
4. One aircrewman had been removed and transported, by personal conveyance, to a civilian hospital about 20 miles away by a Mr. TARSONS of the Hidden Ranch nearby. Mr. TARSONS left before anyone else arrived at the scene. His rescue methods are unknown at this time.
5. The other two aircrewmembers had been removed by California State Division of Forestry personnel, who were the first fire fighting personnel and equipment on the scene, and taken to MCAS, El Toro on the SAR Helicopter. With the aircraft lying on its left side, their rescue methods were:
 - a. Cut out the center and right front cockpit windows and frame with portable hand rescue saw and cut the frame electrical wiring with bolt cutters. Enclosure (2). This enabled them to remove one aircrewman from the left front seat after unstrapping him. This crewman was placed on a stretcher and carried up a 30 foot slope to be evacuated from the scene. See roadway distance from crashed aircraft, enclosure (3).
 - b. The remaining aircrewman was located just below the right side door against the left side of the fuselage and evacuated in the same manner as the second aircrewman.
6. A magnesium fire was only aircraft fire still burning (aft section of the aircraft) out of control at this time. An effort was made by crash-rescue personnel to suppress this fire using shovels from the forestry vehicles to throw dirt on the fire. This effort proved unsuccessful due to the magnitude of the magnesium fire. See enclosure (4). A small brush fire started by the crash was quickly extinguished by forestry personnel.

(ENCLOSURE (1))

7. Total extinguishment was achieved within 20 minutes after the arrival of surface crash equipment. Only three (3) TMB hand extinguishers and 300 gallons of water was used to extinguished this magnesium fire. See enclosure (5).

8. The Ice Detector Probe Capsule, P/N 1278-18&1M, was not immediately located at the crash site and was presumed destroyed by fire. One sealed ignition unit junction box, P/N 10-187900-3, 3-5 microcuries, "Cesium Barium 137" was found. See enclosure (6). The other ignition unit was destroyed in the fire. An immediate radiological survey conducted by MCAF Crash personnel, at the scene using an AM/POR-27 Radiac Instrument (carried on all MCAF Crash Trucks) indicated a normal reading for the area.

9. During subsequent salvage operations, at 1100 on 5 July 1968, the Ice Detector Probe was located and found to be leaking (about 200 yards from the crash scene higher up on the hill). See enclosures (7) and (8). Readings were as follows:

a. $11\frac{1}{2}$ MR/HR @ 3 - 5 CM

b. 5 -7 MR/HR @ 1M

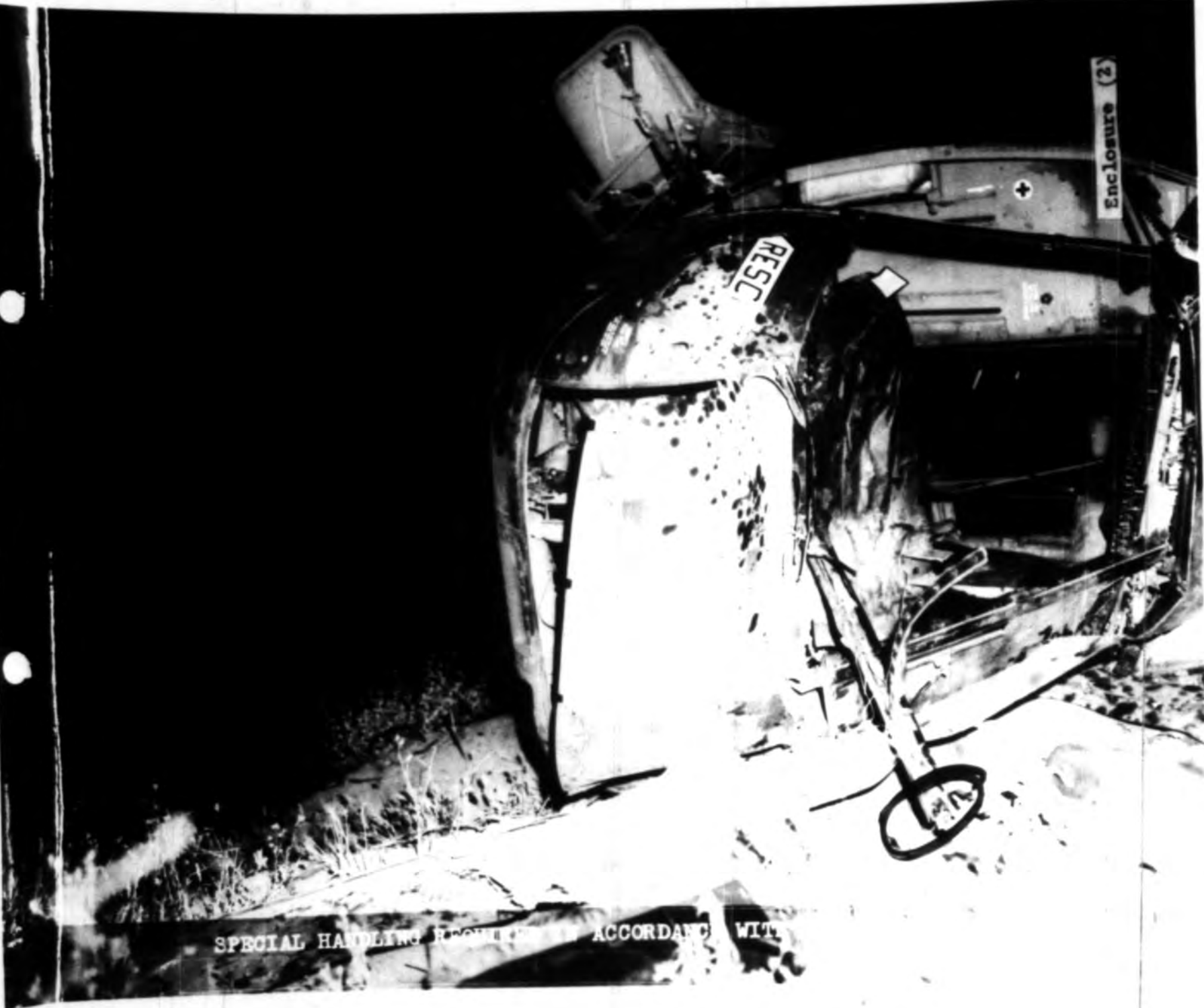
Note: Normal reading is 3 -5 MR/HR @ 1 - 3 CM or, 2 MR/HR on the surface.

10. This leakage was enough to present a health hazard should personal contact have been made with the unit. No one, upon questioning by the MCAF NCOIC of the NBC Branch, had been close or touched the unit. A radiological monitoring of personnel in the vicinity indicated normal.

11. The Ice Detector Probe was turned over to the NCOIC of the MCAF NBC Branch for handling and disposition in accordance with NAVAIR 01-1A-509.

12. One MCAF Crash Truck with four men remained at the crash scene throughout the night.

(ENCLOSURE (1))



SPECIAL HANDLING REQUIREMENTS ACCORDANCE WITH



Enclosure (4)



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

Enclosure (5)

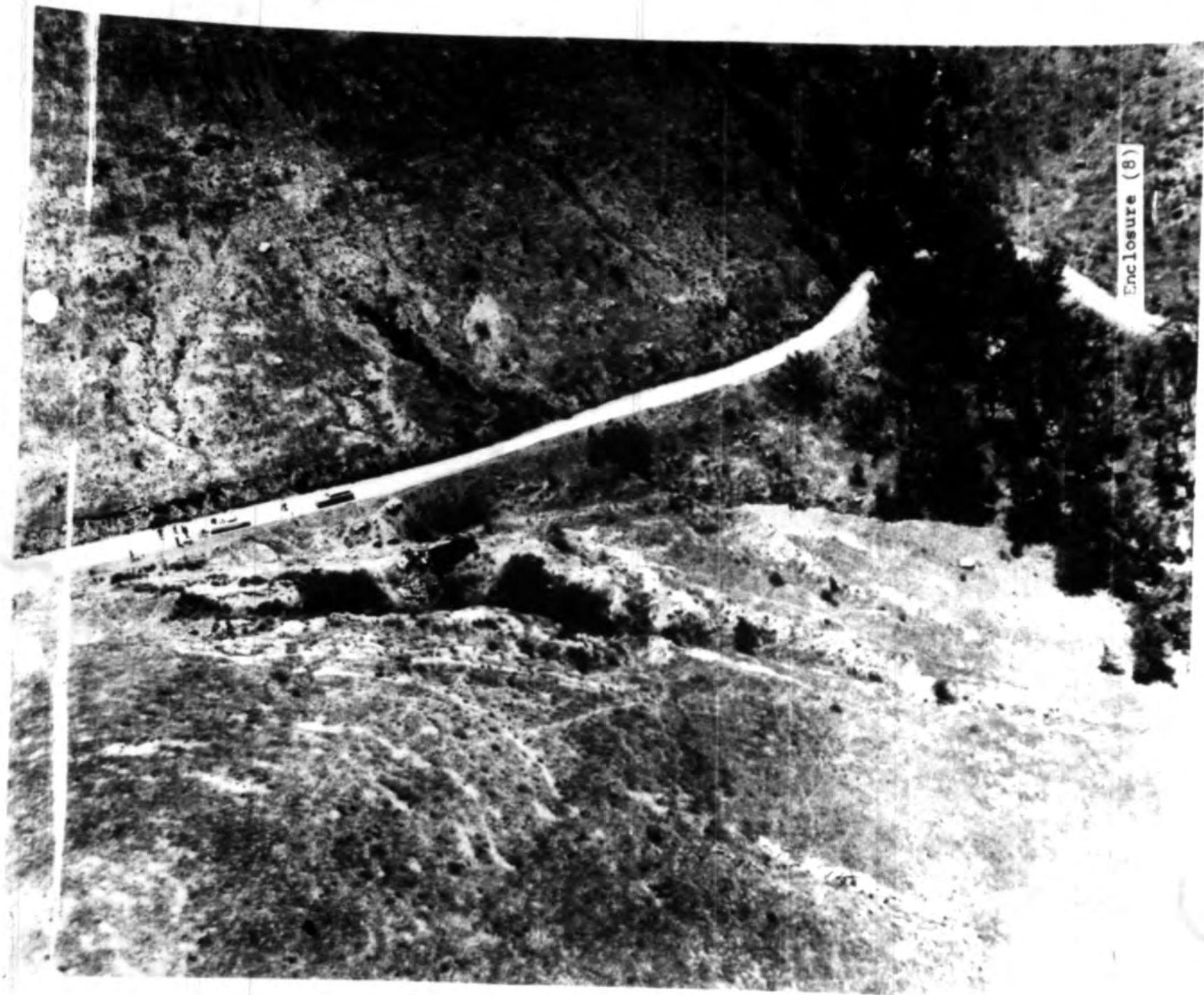


SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

Enclosure (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH AVINIST 3750.6 SERIES





Enclosure (8)

SEP 6 1968

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIESFIFTH ENDORSEMENT on HMMT-302 AAR ser 1-69A concerning CH-46D
BuNo 153343 accident occurring 2 Jul 1968, pilot BAGWELLFrom: Commander Naval Air Force, U. S. Pacific Fleet
To: Commander, Naval Safety Center

Subj: HMMT-302 AAR ser 1-69A

1. Forwarded, concurring with the conclusions and recommendations of the Aircraft Accident Board, as modified by the remarks contained in subsequent endorsements.
2. COMNAVAIRPAC supports the recommendation that an urgent priority be assigned to an integral blade inspection method in order to ensure timely detection of rotor blade spar defects, prior to an inflight failure. At present, there is no satisfactory method of inspecting the blade spar. Currently, it appears that NARF NORIS will provide, by October 1968, a magnetic perturbation device that will detect "Lap" flaws in the major area of concern. It is highly desirable that an integral spar inspection system (ISIS) be designed which would be compatible with the H-46 rotor blade.
3. The H-46 seat retention design is compatible with military specifications. The present H-46 seats are designed to the following specifications, i. e., 10G's downward, 20G's forward, and 20G's laterally. These design specifications are set forth to encompass the average "hard" landing. However, in a situation wherein these design limits are exceeded, a seat failure can be expected.

(b) (6)

Force Aviation Safety Officer

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CG 3RD MAW
NAVPLANTREPO MORTON
CO MHTG THREE ZERO
CO MARMEDHELTRARON THREE ZERO TWO
DIR AFIP

ch

ORIGINAL

30/sep
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19 AUG 1968

FOURTH ENDORSEMENT on HMMT-302 accident, serial 1-69A, concerning CH-46D BuNo 153343, of 2 July 1968, pilot BAGWELL

From: Commanding General, Fleet Marine Force, Pacific
To: Commander, Naval Safety Center
Via: Commander, Naval Air Force, Pacific

Subj: HMMT-302 AAR Serial 1-69A Pilot BAGWELL

Encl: (13) FMFPac msg 040031Z/Aug68

1. Forwarded concurring with the conclusions and recommendations of the Aircraft Accident Board and subsequent endorsers subject to the following:

a. Two aircraft accidents have occurred in the CH-46 due to rotor blade failures. This headquarters strongly concurs with the First Endorsement that an integral blade inspection system be incorporated in the CH-46 at the earliest possible date.

b. Comments as to CH-46 rotor blade reliability and inspection are included as Enclosure (13).

c. Almost every CH-46 accident reiterates the shortcomings of the pilot's armored seats. Continued emphasis must be placed on improving the seats to preclude them from breaking away from the aircraft in a mishap.

d. A permanent type seat for the crew chief is desirable, however, the configuration of the CH-46 and the crew chief duties that require him to be out of the seat during certain operations would negate the feasibility of installing a seat for the crew chief. Concur with Second and Third Endorsements on present safety and security for the crew chief.

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CO, MHIG-30
CO, HMMT-302
Dir AFIP

(b) (6)

By direction

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

ORIGINAL

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3750
13 AUG 1968

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

THIRD ENDORSEMENT on HMMT-302, accident, serial 1-69A, concerning CH-46D BUNO 153343 of 2 July 1968, Pilot BAGWELL

From: Commanding General, 3d Marine Aircraft Wing
To: Commander, U.S. Naval Safety Center
Via: (1) Commanding General, Fleet Marine Force, Pacific
(2) Commander, Naval Air Force, U.S. Pacific Fleet

Subj: HMMT-302 AAR Ser 1-69A Pilot BAGWELL

Ref: (a) OPNAVINST 3750.6F
(b) Naval Air Rework Facility, Naval Air Station, North Island ltr 341/AJP:eh/Ser 2925 of 7 Aug 1968 (NOTAL)
(c) Telecon Mr. BAKER, NASCOMREPAC Code 3312 and Mr. HEFNER, NASCOMREPAC Field Rep MCAS, El Toro
(d) CG 3d MAW msg 171653Z July 1968 (NOTAL)

1. Forwarded concurring with the conclusions of the Aircraft Accident Board and previous endorsers.
2. Reference (b) is the DIR report of the failed Rotor Blade (S/N A-2-668), and confirms the primary cause factor as determined by the Aircraft Accident Board. Reference (c) corrects the Rotor Blade number (S/N A-2-668) and DIR control number (2793-68) which are incorrect in reference (b). A message indicating same will follow from NARF, NAS, North Island.
3. Available information indicates Vertol/Boeing is presently developing proposals for improved seat retention for the pilot's and co-pilot's seats in CH-46 aircraft.
4. The Crew Chief has a gunner's (crewman's) belt available and should utilize this belt any time he has to leave his seat.
5. Reference (d) is CG 3d MAW's message requesting improved CH-46 Rotor Blade inspection equipment and techniques.

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CO, HMMT-302
FILE


A. H. ADAMS

44725

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

ORIGINAL

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3750
6 August 1968

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECOND ENDORSEMENT on HMMT-302, accident, serial 1-69A, concerning CH-46D BuNo 153343 of 2 July 1968, Pilot BAGWELL

From: Commanding Officer, Marine Helicopter Training Group 30
To: Commander, U.S. Naval Safety Center
Via: (1) Commanding General, 3d Marine Aircraft Wing
(2) Commanding General, Fleet Marine Force, Pacific
(3) Commander, Naval Air Force, U.S. Pacific Fleet

Subj: HMMT-302 AAR Ser 1-68 Pilot BAGWELL

Ref: (a) OPNAVINST 3750.6F

Encl: (12) Seven Photographs

1. Forwarded, concurring with the conclusions and recommendations of the Aircraft Accident Board and the first endorsement subject to the following comments and recommendations:
2. This accident illustrates the consequences of "quality assurance" failure on the part of many echelons. The manufacturer must provide "quality assurance" by virtue of uncompromising design factors and fabrication techniques. In use "quality assurance" must be provided for by unerring testing devices and the services of highly qualified technicians. The Squadron Commander's comments regarding inadequacy of the eddy current testing device are strongly reiterated. It is recommended that urgent action be taken to provide the electro-magnetic test device which is now some nine months beyond the programmed delivery date. The fact that a detected anomaly of the spar, in the vicinity of the ultimate failure, was cleared by an x-ray technician indicates a low factor of reliability with this inspection method. Finally, "quality assurance" must be provided for by fail-safe maintenance instructions and methods of application. In this accident the instructions were there, but a Murphy (placing the blade on the wrong inspection cycle) proceeded undetected. Strong supervisory action by all levels is required.
3. The tragic loss of the pilot and the extent of injuries to the co-pilot, attributed to "another" seat failure, demand action to improve seat retention capabilities.
 - a. Enclosure 12a through g are submitted as an addendum to the AAR to further define the seat retention problem area.
 - b. As indicated by enclosure 12a through g, the seats separated from the I beam track installation due to failure of the channel assembly gripping feet. Both the I beam track installations and channel assembly gripping feet are constructed of an aluminum alloy.

c. As shown in enclosure 12e, f and g, the I beam track installations and adjacent floor area were undamaged in this accident. The I beam track installations are made with narrow portions in the center section to facilitate removal and this is not to be construed as a damaged area in the enclosures.

d. The original design specifications for these seats are 10 G's forward, 15 G's downward and 8 G's lateral. Boeing ECP 211 upgraded the G factors to 20 G's forward, 20 G's downward and 10 G's lateral on non-armored seats and 8.9, 10.2, 3.8 G's for armored seats. Boeing ECP 378 (Sigma 2 Modification Program) is designed to increase the forward load carrying capacity of the armored seats to 16 G's. ECP 378 will not increase the downward or lateral capacity.

e. It is evident from this accident that the channel assembly gripping feet impact tolerance is inferior to that of the track installations and cockpit deck.

f. It is highly recommended that the present aluminum channel assemblies be replaced by channel assemblies having greater G load factors than the flooring where they are attached. If there is to be a failure in this area, the tearing of the retained flooring will assist in decelerating the impact forces and this is far more acceptable than that of channel assembly and track installation separation. The possibility of utilizing steel channel assemblies and track installations should be studied.

g. The reporting custodian has been directed to request an engineering analysis of the co-pilots seat to determine the G forces exerted on the seat to cause channel assembly separation. A supplementary report will be submitted if applicable.

4. The problem of providing the crew member with adequate protection yet permitting him to fulfill his look out responsibilities will require extensive study. As an interim, NATOPS guidance wherein the crew member will be strapped in a seat except for essential duties requiring his presence up and about the cabin will minimize the hazard factor.

5. The Maintenance Officer's statement as an enclosure to the AAR has been omitted and is incorporated in the AAR account.

W. W. Eldridge, Jr.
W. W. ELDRIDGE, JR.

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CO, HMMT-302
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ORIGINAL

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3750
29 July 1968

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6F

FIRST ENDORSEMENT on HMT-302 MHTG-30 3dMAW AAR Ser: 1-69A concerning CH-46D BuNo 153343 occurring 2 July 1968, pilot BAGWELL

From: Commanding Officer, Marine Medium Helicopter Training Squadron 302
To: Commander, U.S. Naval Safety Center
Via: (1) Commanding Officer, MHTG-30
(2) Commanding General, 3dMAW
(3) Commanding General, FMFPac
(4) Commander, Naval Air Force, U.S. Pacific Fleet

Subj: HMT-302 AAR Ser: 1-69A pilot BAGWELL

Ref: (a) OPNAVINST 3750.6F

1. Forwarded, concurring with the conclusions and recommendations of the Aircraft Accident Board.
2. The following comments relevant to the AAR Board recommendations are submitted in accordance with the provisions of paragraph 40.b of reference (a).

a. Squadron maintenance control procedures have received extensive review. Procedures governing compliance with both special and conditional maintenance inspections have been corrected to reflect the requirements specified in IRC cards numbered 36 and 37 of NAVAIR 01-250PDA-6-2 of 1 February 1968. These inspections are documented and logbook entries are made in accordance with paragraph 31402.2 page 111-24 of the 3M manual and paragraph 805 sub-paragraph b page 8-8 of NAVAIR Instruction 4700.2 with change 5. The procedure followed formerly utilized support action forms covering special inspections as per paragraph 805 sub-paragraph c with only initial inspection log book entries as prescribed in paragraph 6b of NAV AIRFORM 13090/2 (7-67).

Subsequent to this AAR, all of this squadron's helicopters have been equipped with ultrasonically-tested (UT) blades; however since non-UT blades are still present within the supply system, a system has been incorporated to augment existing procedures. This system includes identification of any non-UT blade, its inspection cycle, location on aircraft and inspection requirements through strict adherence to Interim Airframe Bulletin (IAP Bul) 103 Rev F and according to the procedures governing conditional inspections as outlined above.

b. This squadron concurs wholeheartedly with recommendation number 2. As discussed in CG 3dMAW message R171653Z July 1968 NOTAL the adequacy of

inspection requirements as now specified in H-46 IAPBul 103 Rev B do not provide sufficiently safe inspection criteria because:

1) The eddy current method of inspection only covers 85% of the blade area and thus does not provide positive detection of all defects, either manufacturer's or service induced. In addition my 100059Z April 1968 NOTAL reported that the maintenance upkeep problems and the design inefficiency of eddy current test equipment required excessive expenditure of maintenance manhours. Further, the inability of this equipment to differentiate between numerous irregularities in the zinc plating induced during manufacture at random location on the blade and void flows make it unacceptable and unreliable.

2) The increased capability electro-magnetic test equipment which IAPBul 103-B indicated would be available in November 1967 for use in lieu of the eddy current method is still not available eight months later.

3) Although the improved reliability of the UT blades, as a result of redundant ultrasonic test is recognized, the same type of human error which resulted in the manufacturer's defect and subsequent resultant fatigue crack which went undetected to ultimate failure on Bureau Number (Bu No) 153343 can be considered applicable to the UT blades. It is quite possible that through human error, a manufacturer's defect in a UT blade can, if not detected during ultrasonic testing, continue in service to ultimate fatigue failure since no further testing is now required in accordance with IAPBul 103 Rev B.

4) It is therefore recommended that a integral system with the capability similar to RIM be incorporated immediately and that all non-equipped blades be retrofitted to incorporate this inspection method.

c. Concur and recommend further that, as an interim measure, all non-UT blades be phased out of service and their use be discontinued until all blades are inspected and cleared of defects by magnetic perturbation equipment. Naval Air Rework Facility North Island's message 152329Z July 1968 NOTAL recommends that UT blades be added to IAPBul 103 Rev B inspection cycle. Subsequent to the crash of BuNo 153343, this squadron conducted eddy current inspection of 97 UT blades with eddy current rejection of 48. Further dye penetrant checks of these 48 UT blades revealed no defects. In absence of further instruction UT blades are installed and flying operationally without further recourse to inspection by eddy current methods. It is requested that these instructions be defined and a course of action be determined to preclude the outcome suggested in sub-paragraph (3) above.

d. As discussed in the Medical Officer's Report (MOR), Summary and Conclusions (Enclosure 16 of the MOR), Major PAGEELL's fatal injuries and those injuries sustained by the co-pilot, Lt. (b) (6) were caused directly by the failure of the seat mooring upon final impact of the helicopter.

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It is the opinion of this squadron that sufficient data has been accumulated verifying this hazard to warrant an urgent airframe change to ensure better retention of the pilots' seats during a crash. As pointed out in the MOR and the AAR this retention factor should be at least equal to the specifications now required of the seat belt and shoulder harness.

e. Helicopter crewchief's duties frequently require that he be standing during landings and take-offs. This is a result of the design of the aircraft and the nature of the operations in which helicopters engage. It is particularly applicable to operations within confined areas. At such times his personal safety must be compromised to better ensure the safety of the helicopter and crew as a whole. It would be ideal to provide him with a crash resistant seat, so located as to permit him to perform his lookout functions without leaving the seat.

It is the undersigned's opinion that the least that can be done is to provide the crew chief with a permanent type seat which will afford him crash protection similar to that afforded the pilots. This seat should be located in a position to permit him to perform his lookout duties to the best degree possible without leaving his seat. This would reduce the number of occasions in which he would need to leave the seat. It would provide him better crash survivability when occupying the seat. The rationale for providing the crew chief with a permanent type seat as opposed to requiring him to occupy one of the standard passenger-type seats aboard the helicopter is as follows:

1) The crew chief is a permanent member of the crew and aboard on all flights.

2) He therefore rates increased crash protection.

3) His seat should be so located as to permit him to perform his inflight functions and still remain seated and strapped in.

The recommendations as outlined in the AAR Board recommendation #5 will be submitted in accordance with OPIAVINST 3510.9 series.

f. The information regarding cargo loading and its recommended inclusion in the CH-46D NATOPS/Flight Manual will be submitted in accordance with OPIAVINST 3510.9 series. Additionally it will be recommended that this same information, in abbreviated form, be included as a part of the CH-46 pocket check list for crew chiefs.

In the interim, positive steps have been taken by the NATOPS section to publish the accepted tie-down procedures and to ensure that the weight trailers are secured, at all points, to the correct load-bearing rings. And finally that the cargo straps will be correctly secured.

3. Item 18 of the MOR indicates that Lt. (b) (6) was overdue for an

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with OPIAVINST 3750.6P

annual flight physical. Lt. (b) (6) Records at the MCAF Dispensary confirm his being scheduled for a flight physical in early July 1968. Also this squadron has on file a valid up-chit (Medical Flight Clearance).

On section D of the MOR- anthropometric data- the required measurements were not taken during the post-mortem by the attending physician nor were they available in Major BAGWELL's health record.

4. The date of the last Aviation Safety Survey is 3 June 1968.

G. H. Buckner
G. H. BUCKNER

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Dir, AFIP
CO, MHTG-30
CO, HMT-302 (4)

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with OPIA.VINIST 3750.6F

[illegible]

PART I GENERAL

SECTION A. IDENTIFICATION	1. COMMANDER'S REPORT COMPLETED BY Commanding Officer HMMT-302, MHTG-30, 3dMAW		2. SERIAL NO. 1-69A	3. DTG (LOCAL) OF MISHAP 022025T July	4. MODEL AIRCRAFT CH-46D	5. BUREAU NUMBER 153343
	6. PMPPac TO: Commander, Naval Aviation Safety Center			9. LOCATION OF MISHAP		10. DAMAGE
	7. VIA:		8.	11. TIME OF DAY	12. TIME IN FLIGHT	13. FLIGHT CODE
				14. CLEARED FROM: TO:		
				15. TYPE CLEARANCE	16. AIRSPEED	17. A/C WEIGHT
18. BRIEF DESCRIPTION OF MISHAP				19. ELEVATION AT TIME OF MISHAP S.L. TERRAIN		
20. LIST MODEL, BUNO, REPORTING CUSTODIAN AND DAMAGE CLASSIFICATION OF ANY OTHER A/C INVOLVED (Complete OPNAV Form 3750-1 for each A/C)						

SECTION B. CONTRIBUTING FACTORS	✓	FACTOR	✓	FACTOR	✓	FACTOR
		1. PILOT ERROR IN TECHNIQUE/JUDGMENT		9. SERVICING PERSONNEL		17. WEATHER
		2. PILOT DEVIATION FROM NATOPS PROCEDURES		10. LANDING SIGNAL OFFICER		18. DESIGN AIRCRAFT
		3. PILOT INCORRECT OPERATION OF A/C SYSTEM		11. OTHER PERSONNEL (Specify)		19. DESIGN CREW EQUIPMENT
		4. PILOT OTHER (Specify)		12. ADMINISTRATIVE		20. DESIGN OTHER (Specify)
		5. CREW		13. FACILITIES-RUNWAY, OVERRUN TAXIWAY, FLIGHT DECK		21. ROLLING/PITCHING DECK ROUGH SEAS
		6. MAINTENANCE PERSONNEL		14. FACILITIES-NAV AIDS, LANDING AIDS (GCA, CCA, ILS, MIRROR)		22. MATERIAL FAILURE/MALFUNCTION
		7. MAINTENANCE SUPERVISORY PERSONNEL		15. FACILITIES-CATAPULT, ARRESTING GEAR (Ship or field)		23. UNDETERMINED
	8. SUPERVISORY OTHER (Specify)		16. FACILITIES OTHER (Specify)		24. OTHER (Specify)	

SECTION C. PERSONNEL DATA	1. NAME (LAST, FIRST, & MIDDLE INITIAL)		2. RANK/ RATE	3. FILE/ SERVICE NO.	4. DESIG- NAIR	5. BRANCH OF SERVICE	6. AGE	7. YEARS EMP. USA	8. BILLET	9. POSITION	10. INCH. CARD	
	PILOT (AT CONTROLS AT TIME OF MISHAP)											
	CO-PILOT (IDENTIFY & SUBMIT SEPARATE PAGE 1)											
	(b) (6)		1/Lt	(b) (6)		USMCR	24	1/4	(FUI) Student Rt Seat B			
	ITEM		ITEM		ITEM		ITEM		ITEM		ITEM	
	11. ALL MODELS		274		17. CV LANDINGS DAY/NIGHT		ALL		0		0	
	12. ALL MODELS IN LAST 12 MONTHS		234		18. FCLP LANDINGS LAST 6 MONTHS DAY/NIGHT		ALL		0		0	
	13. ALL MODELS IN LAST 3 MONTHS		83		19. INSTRUMENT HOURS LAST 3 MONTHS ACTUAL/SIMULATED		ALL		2		15	
	14. ALL SERIES THIS MODEL		A/C 72		20. NIGHT HOURS LAST 3 MONTHS		ALL		18		18	
	15. ALL SERIES THIS MODEL LAST 12 MONTHS		A/C 72		21. TOTAL HOURS IN Helicopter HELOS (if helo mishap)		ALL		140		140	
16. ALL SERIES THIS MODEL LAST 3 MONTHS		A/C 72		22. LAST PRIOR FLIGHT ALL SERIES THIS MODEL		DATE		1 July 1968		DURATION		
23. DATE/GRADE LAST NATOPS STANDARDIZATION CHECK		None		24. TYPE INSTRUMENT CARD		Standard						
OTHER PERS.	25. NAME (LAST, FIRST, & MIDDLE INITIAL)		26. DNA	27. RANK/ RATE	28. BRANCH OF SERVICE	29. FILE/SERVICE NO.	30. UNIT	31. INJURY	32. BILLET	33. POSITION		

PART II MAINTENANCE, MATERIAL, AND FACILITIES DATA

A. A/C HISTORY	1. DATE OF MANUFACTURE	2. FLIGHT HRS. SINCE ACCEPTANCE	3. NO. OF PAR/ OVERHAUL	4. MONTHS SINCE LAST PAR/ OVERHAUL	5. FLT. HRS SINCE LAST PAR/ OVERHAUL	6. LAST/ PAR OVERHAUL ACTIVITY	7. TYPE OF LAST CHECK PERFORMED	8. FLIGHT HOURS SINCE LAST CHECK	9. DAYS SINCE LAST CHECK	
	Dec 66	528.1	N/A	1/A	N/A	N/A	5th Cal Insp	71.2	54	
B. ENGINE HISTORY	1. ENGINE MODEL	2. ENGINE SERIAL NUMBER	3. FLIGHT HRS. SINCE ACCEPTANCE	4. NUMBER OF OVERHAULS	5. WAS DIR. REQUESTED?	6. FLT. HRS SINCE LAST OVERHAUL	7. LAST OVERHAUL ACTIVITY	8. TYPE OF LAST CHECK PERFORMED	9. FLIGHT HOURS SINCE LAST CHECK	10. DAYS SINCE LAST CHECK
	(1)									
	(2)									
	(3)									
	(4)									
C. COMPONENT HISTORY	1. COMPONENT INVOLVED NOMENCLATURE	2. MANUFACTURERS PART NUMBER	3. TOTAL HRS. ON PART	4. NO. OF OVER- HUALS	5. HOURS SINCE LAST OVERHAUL	6. OVERHAUL ACTIVITY	7. WAS DIR. REQUESTED?	8. SER. NO. FUR/AMPFUR		
	AFT Rotor Blade	A02R 1502-2	103	N/A	N/A	N/A	Yes	0238		
	(2)									
	(3)									
	(4)									
D. INCIDENTS & GROUND ACCIDENTS	1. PARTS REPAIRED		3. DIRECT MANHOURS INVOLVED		2. PARTS REPLACED					
	PART NUMBER	NOMENCLATURE			PART NUMBER	NOMENCLATURE				
E. ENGINE FAILURES	JET ENGINE FLAMEOUT (Include intentional securing to prevent engine damage)									
	AT TIME OF FLAMEOUT	1. ALTITUDE	2. IAS	3. RPM	4. EGT.	5. MANEUVER AT TIME OF FLAMEOUT	6. FUEL FLOW	7. ATTITUDE		
	8. G FORCES	9. RELIGHT <input type="checkbox"/> ATTEMPTED <input type="checkbox"/> ACCOMPLISHED	10. ALTITUDE	11. IAS	12. MAX EGT	13. FUEL CONTROL <input type="checkbox"/> PRIMARY <input type="checkbox"/> MANUAL	14. NO. RELIGHT ATTEMPTS			
	INTENTIONAL SECURE	15. ENGINE SYMPTOMS	16. CAUSE OF SYMPTOMS							
	RECIPROCATING ENGINE FAILURE									
F. OTHER REPORT	17. ALTITUDE	18. IAS	19. ATTITUDE	20. RPM	21. MAP	22. TORQUE/BMEP	23. FUEL FLOW PRESSURE	24. OIL PRESSURE		
	INTENTIONAL SECURE	25. ENGINE SYMPTOMS	26. CAUSE OF SYMPTOMS							
	IDENTIFY OTHER REPORTS CONCERNING THIS MISHAP									
F. OTHER REPORT	1. AMPFUR SERIAL NUMBER <u>Item C-8 above</u>									
	2. DIR MESSAGE REQUEST DATE-TIME-GROUP <u>MARHELTRARON 302 070106Z Jul 68</u> <small>See para. 38 OPNAVINST P3750.68 on DIR request.</small>									
	3. OTHER <u>Prelim 030923Z Jul 68</u>									
	4. <u>Supp #1 040130Z Jul 68</u>									
	5. <u>Supp #2 080434Z Jul 68</u>									
6. <u>Safety UR 080436Z Jul 68</u>										
7. <u>Prelim DIR NARF NORIS 080422Z Jul 68</u>										
8. <u>Supp DIR NARF NORIS 100539Z Jul 68</u>										

1. EQUIPMENT INVOLVED <input type="checkbox"/> CATAPULT <input type="checkbox"/> ARRESTING GEAR		2. PRESSURE SETTING		3. WIND OVER DECK		4. RELATIVE WIND		5. APPROACH/END SPEED	
6. MARK NUMBER		7. MODEL NUMBER		8. LOCATION ON SHIP		9. LAUNCHING BRIDLE AND BRIDLE ARRESTER			
10. CATAPULT/ARRESTING GEAR BULLETINS OR NOMOGRAMS USED									
11. This portion shall be completed whenever (1) an aircraft accident involves arresting gear barrier and/or barricade equipment, or (2) an aircraft accident involves malfunctioning of arresting gear, barrier and/or barricade equipment. Incidents or routine damage to cables, weldings and other expendable equipment need not be reported herein.									
G. SHIPS DATA	ENGAGED	12. DECK RUNOUT (FEET)	13. RAM TRAVEL (INCHES)	14. CONTROL VALVE SETTINGS CONSTANT PRESSURE DOME (P.S.I.) RATIO		15. ACCUMULATOR PRESSURE (PSI)		16. COMMENTS (for cable failures specify no. landings and months in service)	
	DECK PENDANT								
	DECK PENDANT								
	BARRIER/BARRICADE								
H. DEPLOYMENT	FOR ACCIDENTS ABOARD CARRIERS (Complete on pilot)								
	1. DATE DEPLOYED CONUS		3. DAY HOURS/LANDINGS SINCE DEPLOYMENT			4. DAY HOURS/LANDING LAST 30 DAYS			
	2. NO. DAYS OPERATING PERIOD								
	5. INST. HOURS LOGGED SINCE DEPLOYMENT ACTUAL/SIMULATED		6. NIGHT HOURS/LANDINGS SINCE DEPLOYMENT			7. NIGHT HOURS/LANDINGS LAST 30 DAYS			
I. WEATHER	WEATHER AT SCENE OF MISHAP								
	1. CEILING	2. VISIBILITY	3. Direction WIND DIRECTION AND VELOCITY		4. TEMPERATURE RUNWAY OUTSIDE AIR		5. DEW POINT	6. ALTIMETER SETTING	
	Clear	10 MI.	Est 220/4		65 F		61 F	29.93	
	7. OTHER WEATHER CONDITIONS (Winds aloft, icing level, sea state, density altitude, as appropriate)								
Density altitude, + 2650 (at crash site)									

PART III ADDITIONAL INFORMATION

PART	SECTION	ITEM	1. REMARKS	2. COPY DISTRIBUTION
				2 CC NAVJMSAFECN DIRECT (AAR)
				4 CC BUREAU DIRECT (NORT)
				1 CC CMC
				1 CC DIR AFIP
				1 CC NAVAIRSYS COM
				1 CC NAVAIRPLANT
				REP MORTON
3. GOVERNMENT PROPERTY				5. DATE SUBMITTED TO CO
COST DAMAGE TO: None				24 July 1968
4. PRIVATE PROPERTY				
None				

PART IV SIGNATURES OF THE BOARD

1. SENIOR MEMBER	(b) (6)	MaintO
W. T. READ, Major, HMHT-302, XO	(b) (6)	UNIT BILLET
(b) (6)	(b) (6)	NATOPS O
(b) (6)	(b) (6)	UNIT BILLET
(b) (6)	(b) (6)	UNIT BILLET

* When preparing Incident and Ground Accident reports, items indicated by an asterisk in the upper right hand corner must be filled in. Other items considered appropriate should also be filled in.

5. (b) (6), Captain, HMHT-302, ASO
6. (b) (6), Captain, HMHT-302, AsstASO
7. (b) (6), WO-1 HMHT-302, QualContC

THE ACCOUNT

PART V THE ACCIDENT

At 1830, on the evening of 2 July 1968, SQ-3 (BuNo 153343) took off from the Marine Corps Air Facility located in Santa Ana, California. The flight was scheduled for three hours, and was to consist of 1.5 hours of general review and 1.5 hours of night tactics (Enclosure 2). The first half of the hop was uneventful, and was conducted as scheduled - mostly practice on those maneuvers in which the pilot under instruction was less than proficient (precision landings, running landings, etc.). For the first half of the hop, SQ-3 did not leave the home field traffic pattern. At approximately 1950, SQ-3 refueled at the Air Facility at which time the pilots were informed that their wingman's aircraft would not be joining them for the second half of the flight (night tactics), due to mechanical difficulties. Major BAGWELL, the Aircraft Commander, decided that they would proceed singly into the Confined Area Landing Sites and concentrate the remaining portion of the flight on night confined area landings. They departed the Air Facility at approximately 2000 and proceeded directly to Confined Area Landing Site #3, located approximately eight miles north of NCAS El Toro, California. This site is approximately 2000 feet MSL. They made three left-hand approaches and landings to Site #3, then decided to practice right hand approaches. A right hand approach to Site #3 necessitates a fairly steep glide slope because of mountain ridges on the flight path. As SQ-3 approached a high 90 degree position, 51 inches of the APT yellow blade separated from the rest of the rotor blade. The co-pilot's statement indicates that no unusual vibration or imbalance was apparent throughout the approach (Enclosure 3). As they approached the landing zone the aft pylon separated from the fuselage at Water Line +71, and carried away the aft vertical drive shaft and rotor system. The nose pitched up due to loss of the aft rotor system until ground contact in a near vertical attitude.

The crew chief was fatally injured during initial impact. The aircraft commander was fatally injured in the secondary impact, and the pilot under instruction sustained major injuries.

The initial impact of the aircraft (minus the vertical shaft, aft pylon and rotor head) was in a tail-low near vertical attitude. The cabin and cockpit sections broke away on initial impact, and secondary impact occurred as the cabin and cockpit sections recoiled with forward momentum striking the left side of the cockpit and then fell back on its left side. Initial impact of the vertical shaft, aft pylon and rotor head occurred approximately 140 feet from the main fuselage (Enclosure 4a).

A fire occurred in the section aft of the cockpit and cabin area. The engines, aft transmission, and aft portion of the cabin were almost completely consumed by the fire. The cabin and cockpit areas forward of approximately Station 350 completely escaped the fire (Enclosure 4b). The aft pylon, vertical shaft and aft rotor section did not burn (enclosure 4c).

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There were civilian witnesses to the accident, although they did not see the actual impact with the ground.

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PART VI DAMAGE TO THE AIRCRAFT

1. Summary of Damage

The aircraft incurred strike damage upon impact with the ground. Prior to impact, the aft pylon above Water Line 71 separated in flight and struck the ground approximately 140 feet from the remaining fuselage (Enclosure 5). The aft upper pylon, rotor head, and aft vertical shaft which had pulled out of the aft transmission, remained intact upon impact inflicting bending and shearing damage to all rotor blades. All of the fuselage forward of Station 253 remained intact. Upon striking the ground, the airframe broke from lower Station 378 diagonally and upward to the right to Station 253. The forward rotor blades shattered upon impact as the aircraft rebounded and toppled to its left side. The forward rotor head remained intact. The aft transmission, mix box and the engines were partially destroyed by the impact and the resulting fire. The number 5 Sync Shaft section broke approximately at its mid-point and the forward portion was pushed into the ground in a near vertical attitude to a depth of 48 inches including 8 inches of the aft end of number 4 Sync Shaft section (Enclosure 4d). The aft portion of number 5 shaft was damaged by fire. The number 1 Sync Shaft section had pushed forward so that the forward spline broke and imprinted on the Shaft Adapter. The number 2, number 3 and number 4 Shaft Adapters failed through torque and compression and the entire Sync Shaft jack-knifed outboard, separating from the Sync Shaft tunnel. Both stub wings and landing gear were torn from the fuselage and burned in the fire (Enclosures 4b, e and f).

The cockpit section had damage on the left side from the nose around to and including the forward cabin window (Station 59 to Station 160). The forward window frame (cockpit side window, Station 59) is broken at the deck (W.L. -15), middle (W.L. 15) and at the top (W.L. 44). The entire outer floor section, from forward of the cockpit side window (Station 59) to the bulkhead just aft of the pilot's seat (Station 101) below water line -15 is crushed and broken. Both collectives are broken off at the bottom end. The wind screen in front of the left seat is in place but broken in two places (it is believed that the heads of both pilots hit this window sometime during the impact sequence). The overhead circuit breaker panel is bent and torn loose from the overhead. The instrument panel is bent and broken on the left side and center. The right side of the panel is relatively undamaged. The center console, forward of the engine condition levers, is bent to the left from the deck up and the portion containing the crossfeed and hover aft switches and the SAS controls is crushed inward from the top (Enclosure 4g and h).

The right cockpit deck is undamaged. The left cockpit deck, forward of the seat is crumpled inward. The right seat deck track is undamaged. The right seat has some bending and twisting and has impact marks on the left side of the back and forward edge of the seat pan. Both outboard channel guides on the right side of the right seat are broken. All of the channel guides on the left channel show bending and are abnormally separated. The seat belts of both seats were undamaged.

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The left seat deck tracks are intact and appear to be undamaged (Enclosure 4i). The left seat bucket assembly is bent forward and is twisted down and to the right. The seat back has pronounced 45° buckles from upper right to lower left and is twisted from right to left. The left edge of the seat back is bent-in eight inches from the top. The joint between the seat back and bucket assembly on the right side has two, two-inch cracks. The left joint is torn and partially crushed (the board suspects that the seat belt attaching mechanism caused this as a result of impact with the lefthand pilot's escape hatch handle) (Enclosure 4j). Both outboard guides of the seat's right channel are broken off. The aft outboard and forward inboard guides of the right channel are broken. The aft inboard guide of the right channel is intact but scraped. The forward outboard channel guide is cracked and somewhat bent but still connected.

2. Sequence of impact

The aft yellow rotor blade separated in flight 51 inches inboard from the blade tip. Subsequent rotor blade strike damage inflicted on this section of blade indicates it was thrown through the forward rotor disc and collided with the forward rotor blades. A one foot piece of de-icing blanket, a 14 inch piece of severely damaged blade spar and a section of blade spar with three pockets and tip attached; all identified as portions of the aft yellow rotor blade were found 400 meters back along the flight path from the main fuselage (Enclosures 5, 4a and k).

Subsequent to blade separation the aft pylon above water line 71, aft vertical shaft, and rotor head separated from the aircraft in flight and fell to the ground back along the flight path 140 feet from the main fuselage. Blade strike damage to the terrain in the vicinity of the aft pylon's point of impact indicates the aft rotor head blades were windmilling at the time of impact. The aft yellow rotor blade sheared at the blade root on impact and the other two rotor blades suffered bending and breaking damage. The pylon made a cartwheel after blade contact with the ground and came to rest in a small gully with rotor head and vertical shaft still attached (Enclosure 5 and 4c).

The fuselage collided with the ground vertically tail first, rebounded and toppled to its left side, slightly nose first and oriented 310 degrees magnetic. The fuselage impact was nearly perpendicular to the ground causing portions of the number 5 and number 4 Sync Shafts to be buried into the ground a total of 48 inches. Jack-knifing of the Sync Shaft occurred at the number 2 adapter, and the number 2 bearing housing broke from its support. The force of the impact and resulting fire caused heavy damage to the stub wings, both main landing gear, the aft transmission, the mix box, both engines and all surrounding mounts and fixtures (Enclosures 4b, e and f).

After the near perpendicular impact on the remaining pylon section, the fuselage rebounded slightly and toppled to the left coming to rest on the left side. The forward rotor blades were completely destroyed as the fuselage fell to its side, however the rotor head and transmission area remained

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intact. All three blades were shattered and scattered over a wide area around the point of impact. The entire left side of the airframe suffered compression damage.

The fire occurring in the engine compartment area started after initial impact and caused substantial damage to both engines, aft transmission and entire airframe aft of Station 378.

The cart mounted internal training weight (2800 lbs) tore loose from its tie-downs and tore through the left side of the fuselage at approximately Station 286 and came to rest outside the fuselage upside down.

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PART VII. INVESTIGATION AND ANALYSIS

1. The investigation into the crash began when the HHT-302 AAR Board arrived at the scene of the accident at 0600T, 3 July. The bodies of the Aircraft Commander and Crew Chief had been removed prior to the arrival of the Accident Board members.

a. Mr. Roger PARSONS, a witness to the mishap, arrived at the scene approximately 5 minutes after the crash and rescued the co-pilot, 1/Lt (b) (6). Mr. PARSONS also confirmed that the other two crewmembers were deceased and commenced to fight the fire with the aircraft fire extinguisher and an extinguisher from his truck, (Enclosure 6).

b. Lt (b) (6) was driven to St. Joseph's Hospital, Orange, California by Mrs. Glenn CLANTON and her daughter while Mr. PARSONS stayed to fight the fire (Enclosure 7).

c. Another witness, Mr. Glenn CLANTON, drove down Black Star Canyon Road and notified the Silverado Fire Station operated by the Forestry Service, U.S. Department of Agriculture. The fire station immediately dispatched fire trucks to the scene. Additionally, the fire station notified the Silverado Volunteer Rescue Unit and Marine Corps authorities (Enclosure 8).

d. The Forestry Service fire trucks arrived on the scene at about 2100 and commenced fighting the fire. The Silverado Volunteers arrived shortly thereafter and removed the bodies of the pilot and crew chief from the wreckage.

e. The MCAS El Toro SAR helicopter arrived at 2111T and the pilot assumed control as on-scene commander. An MB-5 fire truck from El Toro and an MB-5 and pickup truck followed from MCAS Santa Ana. Two HHT-302 CH-46D helicopters, also night flying locally, airlifted an ansul unit, doctor, photographer and security personnel to the scene (Enclosure 9).

f. The fire was extinguished by 2310T. One fire truck and the security personnel remained over night.

2. The flight was on an authorized local training hop from MCAS Santa Ana, California. The flight was to have been 3 hours in duration with a refueling stop at MCAS Santa Ana after 1.5 flight hours. Major BAGWELL was the designated PAC and Flight Leader of the two plane section. Lt (b) (6) was assigned student pilot under instruction and was performing the duties of co-pilot. Corporal ABRAMS was designated crew chief (Enclosure 2).

3. Major BAGWELL was designated a Naval Aviator 17 July 1957. He had a total of 3,363 hours of which 1,536 were helicopter hours, 485 of which were in the CH-46 series. During the past 3 months he had flown 63 hours of which 6 were simulated instrument hours, 3 were actual instrument hours and 11 were night hours. A satisfactory instrument flight check was con-

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ducted on 12 April 1968. A MATOPS flight check conducted 12 December 1967 and the check pilot considered Major BAGWELL to be well qualified in the CH-46. One three hour flight, 1.7 hours of it at night, had been flown the previous day. He was sitting in the left pilot's seat.

4. Lt. (b) (6) was designated a Naval Aviator 15 March 1968. He has 274 total flight hours of which 140 are helicopter hours, and 72 hours were flown in the CH-46D. During the past 3 months Lt. (b) (6) has flown 2 actual instrument hours, 18 simulated instrument hours, and 18 night hours, all of which were in the CH-46. He was sitting in the right pilot's seat.

5. Cpl. ABRAMS was designated a crew chief in the CH-46D on 30 December 1967 and was considered well qualified. When reevaluated in flight, in late May 1968, Cpl. ABRAMS showed exceptional ability to handle any situation that arose and went about his job with a sure confidence in his ability to handle any emergency. He possessed a good working knowledge of the aircraft and its systems.

6. No mention of any discrepancy was made by the pilots of SQ-3 during the refueling stop at MCAF Santa Ana, however, the co-pilot's statement (Enclosure 3) mentions that he noticed a slight vertical vibration shortly after the initial takeoff which remained constant throughout the flight. He stated, in a later conversation, that he mentioned it to Major BAGWELL, but was told that the vibration was normal for older H-46's.

7. The Senior Member of the Board interviewed Lt. (b) (6) and the doctor who treated him, the night of the mishap at St. Joseph's Hospital, Orange, California. A preliminary statement, obtained from Lt. (b) (6) by the doctor was amplified upon during the interview with the Senior Member of the Board.

8. Because of Lt. (b) (6) statement, relative to uncontrolled flight, an investigator from the Safety Center was requested. ✓

9. Due to darkness and mountainous terrain the AAR Board did not arrive at the scene of the mishap until 0600T, 3 July 1968 to commence preliminary investigative procedures:

a. The witnesses from Hidden Ranch were located and their statements taken.

b. The investigation at the crash site revealed that the fuselage of SQ-3 had collided with the ground at the 2000 foot level, 30 feet east of Black Star Canyon Road, 350° radial 8 nautical miles from the El Toro Tacan. The aft upper pylon section (above water line 71), containing the aft vertical drive shaft and rotor system was found west of the road, 140 feet from the main fuselage section (Enclosure 5). The terrain is best described as mountainous with sparse tree cover.

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c. The main fuselage impacted the ground in a near vertical attitude tail first. It then rebounded slightly breaking on a diagonal line drawn upwards and to the right from Station 378 to Station 253. The forward portion of the fuselage struck again, nose low, on the left side of the cockpit section and finally came to rest on its left side (Enclosure 4f 4e and 4b).

d. The area around the wreckage was searched and all aircraft pieces were marked and plotted on the wreckage diagram (Enclosure 5).

e. During the afternoon of 3 July a member of the Board, while searching back along the aircraft's estimated flight path (Enclosure 4a), found pieces of rotor blade 400 meters upslope from the fuselage. The blade pieces showed evidence of having struck something with a force greater than could be expected if they had merely fallen to the ground.

10. Commander (b) (6) USN a Safety Center investigator and Mr. I. SENDERHOFF, an accident investigator from the Boeing Company, Vertol Division, arrived the evening of 3 July and participated in the remainder of the investigation.

11. On 4 and 5 July a more intensive search was conducted back along the flight path of SQ-3 for additional parts and/or strike marks of any sort. The results were negative.

12. All major components were found and studied at the scene for evidence of failure prior to removal. Nothing other than impact or fire damage was discovered at that time (Enclosure 4b).

13. Examination of the cockpit area revealed that both pilot seats had broken loose and traveled forward and to the left during impact. Examination by the Flight Surgeon Member of the Board determined that both pilots received their injuries while the seats were in motion, both pilots struck their heads on the left wind screen and that the left side window frame inflicted the fatal crushing type injury to Major BAGWELL. His examination of the crew chief indicates that Cpl. ABRAMS was thrown aft onto the internal weights during the initial impact (Enclosure 1). The seat tracks on the deck of the cockpit were not noticeably damaged while the seat channels showed evidence of having failed laterally (Enclosures 4h, i, g, and j).

14. Examination of the wreckage revealed that the number 5 sync shaft section broke at approximately its midpoint. The forward half, together with part of the number 4 shaft section were driven almost vertically into the ground to a depth of about 48 inches (the number 5 piece being on the bottom), (Enclosure 4j and d).

15. On 5 July, after all of the parts were plotted on the wreckage diagram, they were collected and moved to hangar number 2 at MCAF Santa Ana for further study. The aft upper pylon and the forward portion of the

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fuselage were airlifted externally to Black Star landing site by CH-53. They were then carried by truck to the hangar.

16. Wreckage distribution at the site, the type damage observed, and a thorough search of the surrounding terrain indicate that the aircraft was not intact at the time of the crash. It has been determined that a portion of the aft yellow blade separated from the aircraft first (Enclosure 4 and 5). It is believed that the aircraft was in hover aft and at a low power setting at this time. The co-pilot stated that no abnormal vibrations were noticed (Enclosure 3). It has been determined that an aerodynamic imbalance of such force developed as to cause the aft upper pylon section to separate from the aircraft and the nose to pitch up to an unusual attitude. This separation was closely followed by the crash of the main fuselage section.

17. On the morning of 6 July, Mr. SENDERHOFF discovered what appeared to be a fatigue caused fracture (Enclosures 4c and 1) of the spar on a segment of the aft yellow blade (S/N A-2-668). Further examination revealed that the blade parts found 400 meters from the main fuselage had originally come from the aft yellow blade outboard of the suspected fatigue area (nos. 22, 23, 24, 25 and 28 on the wreckage diagram, Enclosure 5). The part discovered by Mr. SENDERHOFF (no. 4 on encl. 5) was found near the aft upper pylon section (no. 2 on encl. 5). It was further noted that the blade section (no. 4) giving evidence of fatigue failure was relatively undamaged while the section immediately outboard (no. 23) was badly mangled (Enclosure 4k).

18. Arrangements were made on 6 July for an engineering analysis of the suspect blade section (4 and 23) by the Naval Aircraft Rework Facility, North Island (NARP NORIS) the next day. The blade sections were hand delivered by Cndr. (b)(6) Mr. SENDERHOFF and an AAR Board member.

19. NARP NORIS engineers confirmed that the suspect area was in fact a fatigue area of about 4 inches in length. They also stated that the failed area was large enough to have caused blade failure. The fatigued area occurred approximately 51 inches inboard of the blade tip. The engineers further stated that the fatigue emanated from a LAP located 1.5 inches inboard of the outboard edge of the number 14 pocket, 1 10/32 inches forward of the skinline and extended from the upper surface of the spar to a depth of approximately one-third the thickness of the metal (Enclosure 4l). It was surmised, at this point, that the fatigue area grew at a slow rate to about one and one-quarter inches in length. The fatigue rate then increased progressively until it caused a complete failure of the spar.

20. The AAR Board, Naval Safety Center and factory Investigators determined, after a thorough examination of all components, that the initial blade breakup was not caused by any condition existing within the airframe itself. In particular, blade desynchronization was not a factor. It was further determined that, after initial breakup, the aft yellow

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blade tip 4 pocket section did go through the forward rotor system and was struck at least once by this system.

21. Since the aft yellow blade spar fatigue area was the only material failure discovered, it was not considered necessary to submit any additional components for inspection.

22. A complete check of the maintenance and flight records in the custody of HMT-302 and NARF NORIS revealed the following information concerning the aft yellow blade (serial number A-2-668).

a. It had been originally installed on BuNo 153396 at Morton, Pa.

b. After accumulating 24.7 hours it was removed and replaced by a UT blade.

c. IAW IAFB 103 the blade was X-rayed by NARF NORIS 25 July 1967. A possible defect was noted approximately 51 inches from the tip on the top of the spar. A second X-ray was taken and the same deformity was again evident. The technician reading the X-rays, determined that the irregularity on the X-ray was not a spar deformity. The blade was then put back into the supply system. (Refer to F-7-9, Pg. 2)

d. The blade was drawn from supply 21 March 1968 and installed on another CH-46D, BuNo 153343 to replace a blade that had been rejected by Eddy Current. The replaced blade was on a 25 hour Eddy Current inspection cycle. The replacing blade (A-2-668) was still on the 12.5 hour Eddy Current inspection cycle.

e. The method used to keep track of the inspection cycle of the in use blades is a status board kept in the line shack. This board tells which aircraft each blade is on, the inspection cycle of each blade, and time since last inspection.

f. When the blades were switched and A-2-668 was placed on BuNo 153343 the status board was not changed to reflect a 12.5 hour inspection cycle on the new blade vice 25 hours. Consequently, A-2-668 missed its normal 12 and one-half hours inspection by 9.5 hours at the time of the accident. The blade ultimately failed 22.0 hours after its last inspection which was completed 22 June 1968. At that time the rotor blade had accumulated approximately 81.4 hours flight time. Total time on the blade at failure was 103.4 hours.

23. Examination of the wreckage revealed the following information concerning internal training weights aboard at the time of the accident: (Enclosure 4b)

a. That they were found in the central portion of the cabin wreckage area.

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b. That they consisted of large ammunition cans filled with rocks and cement banded to a wheeled cart.

c. That they weighed a total of 2800 pounds.

d. That the wheeled cart was lashed to the deck of the aircraft with 4 nylon tie-down straps (Eastern Rotorcraft Corp tie-down cargo aircraft, Type CGU - 1/B Cap 5,000 pounds, Part no. SP-4212 1), one at each corner of the cart securing the oxles to the deck.

e. That the tie-down rings in the deck of the aircraft used to secure the weights were all of 5,000 pound capacity except one which was a center-line 2,000 pound capacity ring used to secure one end of the right rear strap.

f. That the 5,000 pound tie-down rings held during impact and the 2,000 pound ring pulled out of the deck during impact.

g. That the forward right nylon tie-down strap broke, the forward left tie-down strap slipped its keeper and the two rear straps remained intact.

h. Investigation revealed that there is no specific CH-46 publication concerning proper tie-down procedures of internal cargo and vehicles.

24. The weather at the scene of the accident was clear with visibility 10 miles. Winds were estimated to have been 220° at 4 knots. Outside temperature was 65°F and the dew point 61°F. Density altitude was 2650 feet. Altimeter setting was 29.93.

25. NATOPS considerations:

a. No evidence was found of any deviation from NATOPS procedures by the pilots.

b. The crew chief was not secured by a gunners belt or seat belt at the time of impact. According to NAVAIR 01-250 HDB-1 (CH-46D/UH-46D), Section IX, Landing (p 9-7) - "the crew chief will maintain a lookout at the aft rotor and under the helicopter for clearance of obstacles at the landing site and keep the pilot informed". It is physically impossible for the crew chief to perform this function if he is secured by a seat belt. According to the same section (Sec IX), INFLIGHT under WARNING - "When the crew chief is not in his seat, and is in the vicinity of the open cargo door or hatch, he shall be secured by a gunners belt". As Cpl ARRAHE was not in the vicinity of the open cargo door, nor was the lower portion of the passenger door open, he did not violate the context of this WARNING.

Special Handling Required in Accordance
with OMAVIST 3750.6 Series

PART VIII CONCLUSIONS

1. That material failure of the aft yellow rotor blade (Ser No. A-2-668) was the primary cause factor.
2. That the failure of the radiographic personnel at NARF North Island to properly interpret the X-ray film taken of this blade 25 July 1967 was a contributing cause factor.
3. That the failure of maintenance supervisory personnel to ensure that this particular rotor blade had been inspected at the proper time in accordance with H-46 IAFB 103 Rev. B was a contributing cause factor.
4. That pilot error was not a factor.
5. That the injuries sustained by the pilots were primarily caused by the fact that their seats broke loose from the deck tracks.
6. That the fatal injuries received by the crew chief resulted from the fact that he was not strapped in by a seat belt at the time of impact.
7. That neither X-ray nor eddy current inspection of H-46 rotor blades provides sufficient assurance of detection of spar defects prior to failure in flight.
8. That, although not a factor in this accident, a need exists for detailed instructions to be made available to operating activities concerning the proper security of cargo and vehicles in the CH-46.

Special Handling Required in Accordance
with OPIAVINST 3750.6 Series

PART IX RECOMMENDATIONS

1. That squadron maintenance control procedures be reviewed to assure that required inspections are accomplished at prescribed intervals on all aircraft and/or components.
2. That urgent priority be assigned to the development of an integral blade inspection system for the existing rotor blades or that new blades be designed to incorporate such a system.
3. That, as an interim to an integral blade inspection system, X-ray and eddy current inspections be replaced by an inspection device and/or method to assure timely detection of rotor blade spar defects prior to an inflight failure.
4. That urgent and immediate action be initiated to ensure the development and incorporation of pilot's seats with sufficient strength to withstand lateral, axial and vertical forces equal to or greater than the forces the seat belt and shoulder harness can withstand.
5. That Section IX of the NATOPS Flight Manual be modified to reflect that the crew chief will be seated and secured by a seat belt during all takeoffs and landings except when his duties require him to check the clearance of the aft rotor and/or landing gear. Whenever the crew chief's duties require that he leave his seat in flight he will, whenever possible, be secured by a gunners belt. Subject recommendation will be submitted in accordance with OPNAVINST 3510.9 series.
6. That information similar to that contained in the CH-53 cargo loading manual (NAVAIR 01-230 HNA-9), be incorporated in the P-46 NATOPS/Flight Manuals (NAVAIR 01-250 HDB-1). Subject recommendation will be submitted in accordance with OPNAVINST 3510.9 series.

Special Handling Required in Accordance
with OPNAVINST 3750.6 Series.

INDEX OF ENCLOSURES

1. MOR
2. HMIT-302 2 July 1968 Flight Schedule
3. Statement of 1/Lt R. E. (b) (6)
4. Photographs
5. Wreckage Diagram and Blade Damage Chart
6. Statement of Mr. Roger PARSONS
7. Statement of Mrs. Glenn CLANTON
8. Statement of Mr. Glenn CLANTON
9. Rescue Report
10. Yellow Sheet (Parts A and B)
11. Aircraft Fire Rescue Report (with original only)
12. Seat Separation Photographs

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Special Handling Required in Accordance
with OPNAVINST 3750.6 Series

MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PAGE

OPNAV FORM 3750-6 (REV. 3-63)

SPECIAL HANDLING REQUIRED - See OPNAVINST 3750.6E for instructions.

OPNAV REPORT 3750-7

SECTION A - IDENTIFICATION

1. FROM (Name and mailing address of activity) **HMMT 302, MHTG-30, 3rd MAW, FMF PAC, MCAF, Santa Ana, Calif.** 2. MOR NUMBER **1 - 69 A** 3. LEAVE BLANK

4. TYPE OF MISHAP ☒ ACCIDENT ☐ GROUND ACCIDENT ☐ INCIDENT 5. TIME & ZONE **2025 T** 6. DATE **2 Jul 68** 7. GEOGRAPHICAL LOCATION **350 degrees 8NM El Toro TACAN**

8. MODEL A/C **CH-46 D** 9. BUNO **153343** 10. NO. OF OCCUPANTS **3** 11. DAMAGE CODE **ALFA** 12. UNIT OPERATING A/C **HMMT 302**

13. INDIVIDUALS INVOLVED USE ADDITIONAL SHEETS IF REQUIRED NAME (Last, first and middle initial)	14. UNIT TO WHICH ATTACHED	15. RANK/ RATE	16. FILE/SERV. NO. DESIGNATOR	17. DUTY ASSIGNMENT ABOARD AT A/C MISHAP	18. DATE OF LAST PHYSICAL	19. PHYSICALLY QUALIFIED FOR FLIGHT	20. BRANCH OF SERVICE	21. INJURY CODE	22. DISPO- SITION
A. BAGWELL, LARRY L.	HMMT 302	MAJ	(b) (6)	PILOT	5/13/68	yes	USMC	A	F
(b) (6)	HMMT 302	1/LT	(b) (6)	COPILOT	5/15/67	yes	USMC	B	G
C. ABRAMS, GALE D.	HMMT 302	Cpl	(b) (6)	CREW CHIEF	6/17/68	YES	USMC	A	F
D.									

23. CLARIFICATION OF ITEMS 13-22 WHEN NECESSARY

24. MODEL-OTHER A/C IF INVOLVED 25. BUNO 26. NO. OF OCCUPANTS 27. UNIT OPERATING A/C 28. DAMAGE CODE 29. MOR NO.

30. NARRATIVE ACCOUNT OF MISHAP (Use additional 8 x 10 1/2 sheets if required)

SEE MOR ENCLOSURE #1.

31. PRIMARY CAUSE FACTOR ASSIGNED BY ACCIDENT BOARD

MATERIAL FAILURE

32. CONTRIBUTING CAUSE FACTOR ASSIGNED BY ACCIDENT BOARD

1. MAINTENANCE SUPERVISORY PERSONNEL. 2. NARF NORTH ISLAND SUPERVISORY PERSONNEL.

33. POSSIBLE CAUSE FACTOR ASSIGNED BY ACCIDENT BOARD

34. HAVE ALL FINDINGS, CONCLUSIONS, & RECOMMENDATIONS BEEN MADE AVAILABLE TO THE A/C ACCIDENT BOARD? IF NO, EXPLAIN.

YES ☒ NO ☐

35. REPORT PREPARATION CHECK LIST

☐ ALL PARTS OF FORM COMPLETED ☐ DRAWINGS SKETCHES, PHOTOS ☒ SURVIVORS NARRATIVES ☒ WITNESS STATEMENTS ☒ CONCLUSIONS & RECOMMENDATIONS ☒ REQUIRED COPIES FURNISHED

36. REPORTING OFFICER (Medical officer) **(b) (6)** DATE **24 Jul 68** 37. FOR (Appointing authority) **(b) (6)** DATE **24 Jul 68**
(b) (6) **LT MC USN** **(b) (6)** **MAJOR USMC**

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SUPPLEMENT TO MOR 1-69 A PAGE #2

ITEM #17. X-RAY RESULTS

1. (b) (6)

2.

3.

4.

5.

MOR 1 - 69 A CH - 46 D 153343

BAGWELL, Larry L.

PILOT

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

SECTION E

INDIVIDUAL CHRONOLOGICAL DATA

SEE PAGE 8 PARA. 10 OF INSTRUCTION
TO BE COMPLETED ON PLANE COMMANDER, PILOT, CO-PILOT, OTHER INDIVIDUAL
IN CONTROL OF AIRCRAFT AT TIME OF MISHAP, AND/OR INDIVIDUAL CAUSING THE MISHAP

USE LOCAL TIME AND BRIEFLY RECORD ACTIVITY WITHIN EACH COLUMN

48 HOURS PRIOR TO MISHAP

TIME	
1 Jul 68	
0630	Woke - good nights sleep Carnation instant breakfast.
0730	Physical training at squadron.
0800	Normal squadron duties - details unknown.
1800	Night hop - three hours.
2100	Flight secured.
2130	Home, talked with wife about daughters swimming class.
2320	Fell asleep watching the news on television, good nights sleep
2 Jul 68	
0615	Awoke, normal morning routine, peach and frosty flakes for breakfast.
0730	Arrived at squadron, Morning physical training.
0800	Normal working routine.
1345	Lunch with wife, two beef enchiladas, two chicken tacos, eight soft tortillas, three glasses of iced tea.
1500	Returned to squadron.

TIME	
1830	Take off from Marine Corps Air Facility - review hop.
1945	Refueled, proceeded to site #3 - made three left hand approaches then started right hand approach.
ACCIDENT PHASE	
2025	CRASH
ESCAPE PHASE	
2030	Fatal injury on impact.
SURVIVAL PHASE	

TIME OF RESCUE

MOR NO.	MODEL A/C	SUNO	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH 46 D	153343	PILOT
NAME OF INDIVIDUAL			
BAGWELL, LARRY Lee			
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6E SERIES			
U. S. GOVERNMENT PRINTING OFFICE: 1964-712560			

MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PA

OPNAV FORM 3750-8C (REV. 3-83)

SPECIAL HANDLING REQUIRED - See OPNAVINST 3750.6E for instructions.

OPNAV REPORT 3750-7

SECTION F

PATHOLOGICAL DATA

(Refer to Section F of instructions.)

1. INJURY CODE AND DISPOSITION

A F

2. PRE-EXISTING PHYSICAL DEFECTS

NONE

3. UNCONSCIOUSNESS

☐ NO ☐ YES DURATION:

4. DROWNED

☐

5. ASPHYXIATED

☐

6. SHOCK

☐

MILD

☐ MODERATE

☒ SEVERE

7. EXPOSURE

☐

MILD

☐ MODERATE

☐ SEVERE

8. EXTENT OF CARBONIZATION

NONE

9. IF ADMITTED TO SICK LIST, GIVE DIAGNOSIS

10. PLACE OF HOSPITALIZATION

11. GROUNDED? IF YES, GIVE REASON

☐ NO ☐ YES

12. DURATION (See instruction)

13. PRIMARY CAUSE OF DEATH

(b) (6)

14. SECONDARY CAUSE OF DEATH

15. AUTOPSY CONDUCTED BY:

☒ PATHOLOGIST, MEDICAL OFFICER PRESENT

☐ PATHOLOGIST, MEDICAL OFFICER NOT PRESENT

☐ MEDICAL OFFICER

16.

☐ PROTOCOL ATTACHED

☐ WILL BE FORWARDED

17. WAS "AUTOPSY MANUAL, NAVMED PS065" USED?

☐ YES ☒ NO

18. IF NO AUTOPSY CONDUCTED, GIVE REASON

19.

INJURIES

PHASE SUSTAINED

A E S R

CAUSE AND MECHANISM (If unknown, theorize)

(b) (6)

(b) (6)

20. REMARKS

MOR NO.

1 - 69 A

MODEL A/C

CH 46 D

SUNO

153343

IDENTIFICATION OF INDIVIDUAL

PILOT

NAME OF INDIVIDUAL

BAGWELL, Larry L.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

OP-057

SECTION F (Continued)

SURFACE INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING AND SHADING AFFECTED AREAS
ALL LACERATIONS, ABRASIONS, CONTUSIONS, PUNCTURE WOUNDS, SPRAINS AND BURNS
RECORD ALL INJURIES NO MATTER HOW TRIVIAL, WHETHER PATIENT LIVED OR DIED

(b) (6)

DETAILS OF SKULL FRACTURES AND BRAIN INJURY. DESCRIBE AND SHOW GRAPHICALLY.

1. ALL FRACTURES, BY TYPE (Simple, depressed, or indirect, etc.) 2. SITES OF BRAIN LESIONS, IF ANY. 3. DISLOCATIONS OF MANDIBLE.



MOR NO. 1 - 69 A	MODEL A/C CH 46 D	SUNG 153343	IDENTIFICATION OF INDIVIDUAL PILOT
NAME OF INDIVIDUAL BAGWELL, Larry L.			SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECTION F (Continued)

SKELETAL INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING
ALL FRACTURES BY TYPE (Simple, compound, comminuted, etc.) AND DISLOCATIONS INDICATING DIRECTION OF DISPLACEMENT.

(b) (6)

DESCRIBE AND SHOW GRAPHICALLY: 1. ALL FRACTURES OF SPINAL COLUMN (Simple, compressed, etc.)
2. DISLOCATION AND DIRECTION OF DISPLACEMENT. 3. SITES OF CORD DAMAGE, IF ANY.

DETAILS OF SPINAL INJURIES



MOB NO.	MODEL A/C	BUND	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH 46 D	153343	PILOT
NAME OF INDIVIDUAL			SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES
BAGWELL, Larry L.			

MEDICAL OFFICER'S REPORT OF ACCIDENT, INCIDENT, OR GROUND ACCIDENT — PAGE 5

OPNAV REPORT 3750-7

OPNAV FORM 3750-8F (REV. 3-63)

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION G

ESCAPE, PERSONAL AND SURVIVAL EQUIPMENT

LIST AND CODE IN ACCORDANCE WITH SECTION G OF INSTRUCTION:

PHASE CODES: A-ACCIDENT/MISHAP E-ESCAPE/EGRESS PHASE
S-SURVIVAL R-RESCUE PHASE

1. EQUIPMENT DESCRIPTION INCLUDING SPECIFIC MODEL DESIGNATION	2. MODIFICATION	3. RE- QUIRED	4. AVAIL- ABLE	5. NEED	6. USED	7. FAILED	8. REMARKS (Explain failures, loss, and/or difficulty encountered. Use additional 8x10 1/2 plain paper if needed.)
HELMET PROTECTIVE APH (98415 -268- 7797)		YES	A	A	A		This equipment available, but not brought along on this flight.
COVERALLS, MENS		YES	A	A	A		
FLYING NOMEX							
GLOVES, SHEEPSKIN		YES	A	A	A		
FLYING (8415-904- 5128)							
BOOTS COMBAT TYPE		YES	A	A	A		
SURVIVAL KNIFE (96734D-098-4327)		YES	A				
SHOULDER HARNESS AND LAP BELT		YES	A	A	A		
SEAT CUSHIONS		YES	A				
PEN GUN AND FLARES (1370-866-0788-X667)		YES	A				
FLASHLIGHT, PENLIGHT (966230-223-4547)		YES	A				
INDIVIDUAL SURVIVAL KIT (96545-611-0978)		YES	A				

SECTION H

NARRATIVE OF ESCAPE/EGRESS, SURVIVAL AND RESCUE PHASES

Pilot was killed on impact. His body was removed from the wreckage by the Silverade Volunteer fire department.

MOR NO.	MODEL A/C	BUNO	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH 46 D	153343	PILOT

NAME OF INDIVIDUAL

BAGWELL, Larry L.

OP-05F

☆ U. S. GOVERNMENT PRINTING OFFICE: 1963-698-429

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

MEDICAL OFFICER'S REPORT OF A ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PAGE 6

OPNAV REPORT 3750-7

OPNAV FORM 3750-8G (REV. 3-63)

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION I DETAILS OF ESCAPE/EGRESS/SURVIVAL PHASES REFER TO SECTION I OF INSTRUCTIONS

1. TOPOGRAPHY OF INDIVIDUAL'S LANDING SITE

☐ WATER ☒ LAND ☐ OTHER

2. TYPE OF EGRESS

☐ EJECTION ☐ BAILOUT ☐ UNDERWATER ☐ NORMAL ☒ OTHER (State type) NONE

B	E		REMARKS
	<input checked="" type="checkbox"/>	3. NOT ATTEMPTED	WAS KILLED ON IMPACT.
		4. ATTEMPTED	
		5. ACCOMPLISHED	
		6. THRU CANOPY	
YES	NO	EGRESS DIFFICULTIES	IF YES, EXPLAIN DIFFICULTIES
		7. PRIOR TO EGRESS	
		8. DURING EGRESS	
		9. SUBSEQUENT TO EGRESS	

10. GIVE TYPE AND MODEL OF EJECTION SEAT USED		11. METHOD OF FIRING SEAT <input type="checkbox"/> PRIMARY <input type="checkbox"/> SECONDARY <input type="checkbox"/> OTHER		12. SEQUENCE OF EJECTION	
13. POSITION OF SEAT ON EJECTION <input type="checkbox"/> UP <input type="checkbox"/> DOWN <input type="checkbox"/> FORWARD <input type="checkbox"/> AFT <input type="checkbox"/> OTHER				14. ATTITUDE OR MANEUVER OF A/C AT EXIT	
16. ALTITUDE AT TIME OF EXIT (FEET) ABOVE SEA LEVEL 2600ft. ABOVE TOPOGRAPHY 0				15. AIRSPEED 0	
19. TIME IN WATER		20. TIME IN RAFT		17. ALTITUDE OF PARACHUTE OPENING	
23. WAVE INTERVAL		24. AIR TEMPERATURE		18. WEIGHT	
				22. WAVE HEIGHT	
				25. WATER TEMPERATURE	
				26. VISIBILITY	

27. ALERTING FACTORS		30. NA	
VISUAL SIGHTING		31. NA	
		32. NA	
28. MEANS OF LOCATING ACCIDENT SITE		33. NA	
VISUAL SIGHTING		34. NA	
		35. NA	
29. MEANS OF LOCATING SURVIVOR			
VISUAL SIGHTING			

36. DID INDIVIDUAL DEPART FROM LANDING SITE?
(If Yes, Explain reason and sequence up to rescue)

☒ NO ☐ YES

SECTION J TRAINING FACTORS

1. DATE OF LAST TRAINING

LPC 24 May 62 EJECTION TOWER EJECTION SEAT 24 May 62 SURVIVAL

2. DID THE LACK OF TRAINING AND/OR EXPERIENCE PLAY A PART IN ANY PHASE OF THIS MISHAP? (If yes, explain)

☒ NO ☐ YES

MOR NO. 1 - 69 A	MODEL A/C CH 46 D	SUNO 153343	IDENTIFICATION OF INDIVIDUAL PILOT
NAME OF INDIVIDUAL BAGWELL, Larry L.			SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECTION E

INDIVIDUAL CHRONOLOGICAL DATA

SEE PAGE 8 PARA. 10 OF INSTRUCTION
TO BE COMPLETED ON PLANE COMMANDER, PILOT, CO-PILOT, OTHER INDIVIDUAL
IN CONTROL OF AIRCRAFT AT TIME OF MISHAP, AND/OR INDIVIDUAL CAUSING THE MISHAP

USE LOCAL TIME AND BRIEFLY RECORD ACTIVITY WITHIN EACH COLUMN

48 HOURS PRIOR TO MISHAP

TIME	
1 Jul 68	
0700	Good nights sleep, no breakfast.
0800	El Toro for pre deployment classes.
1200	Lunch, salad, roast beef beans, orangeade, ice cream.
1300	Predeployment classes.
1600	Secured from classes.
1630	Snack-coke and cheese crackers.
1830	Night Hop - good flight.
2130	Flight secured.
2215	Home-supper, roast beef, mashed potatoes, corn.
2330	Shower, to bed.

2 Jul 68	
0645	Woke, good nights sleep no breakfast.
0800	Predeployment classes.
1200	Lunch, cheeseburger, french fries, salad, orangeade, ice cream.
1300	Predeployment classes.
1600	Class secured, to squadron.
1830	Take off from Marine Corps Air Facility - review hop.
1945	Refueled, proceeded to site #3 - made three left hand approaches then started right hand approach.

TIME

ACCIDENT
PHASE

2025

Crash

ESCAPE PHASE

2030

Helped out of wreckage by Mr. Parsons.

SURVIVAL
PHASE

2035

Taken to Saint Josephs hospital by Mrs Clanton.

TIME OF RESCUE 2030

MOR NO.	MODEL A/C	BUNO	IDENTIFICATION OF INDIVIDUAL
1-69 A	CH - 46 D	183343	COPILOT
NAME OF INDIVIDUAL			SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6E
TRIGALET, Robert E.			

MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PA

OPNAV REPORT 3750-3

OPNAV FORM 3750-8C (REV. 2-63)

SPECIAL HANDLING REQUIRED - See OPNAVINST 3750.6E for instructions.

SECTION F

PATHOLOGICAL DATA

(Refer to Section F of instructions.)

1. INJURY CODE AND DISPOSITION

2. PRE-EXISTING PHYSICAL DEFECTS

B G

NONE.

3. UNCONSCIOUSNESS

☐ NO ☒ YES DURATION: **ESTIMATE 3-4 minutes**

4. DROWNED

5. ASPHYXIATED

6. SHOCK

7. EXPOSURE

8. EXTENT OF CARBONIZATION

☐

☐

☒

MILD

☐

MODERATE

☐

SEVERE

☒

MILD

☐

MODERATE

☐

SEVERE

9. IF ADMITTED TO SICK LIST, GIVE DIAGNOSIS

(b) (6)

10. PLACE OF HOSPITALIZATION

SAINT JOSEPHS HOSPITAL

11. GROUNDED? IF YES, GIVE REASON

☐ NO

☒ YES

(b) (6)

12. DURATION (See instruction)

60 days

13. PRIMARY CAUSE OF DEATH

14. SECONDARY CAUSE OF DEATH

15. AUTOPSY CONDUCTED BY:

☐ PATHOLOGIST, MEDICAL OFFICER PRESENT

☐ PATHOLOGIST, MEDICAL OFFICER NOT PRESENT

☐ MEDICAL OFFICER

16.

☐ PROTOCOL ATTACHED

☐ WILL BE FORWARDED

17. WAS "AUTOPSY MANUAL, NAVMED P5065" USED?

☐ YES

☐ NO

18. IF NO AUTOPSY CONDUCTED, GIVE REASON

19.

INJURIES

PHASE SUSTAINED

A E S R

CAUSE AND MECHANISM (If unknown, theorize)

(b) (6)

X

(b) (6)

X

X

X

X

20. REMARKS

Patient was conscious upon arrival of Mr. Parsons on scene, about five minutes after the crash, but was quite confused and has no memory of crash or escape phase.

MOR NO.

MODEL A/C

SUNG

IDENTIFICATION OF INDIVIDUAL

1 - 69 A

CH - 46 D

153343

COPLOT

NAME OF INDIVIDUAL

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECTION F (Continued)

SURFACE INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING AND SHADING AFFECTED AREAS
ALL LACERATIONS, ABRASIONS, CONTUSIONS, PUNCTURE WOUNDS, SPRAINS AND BURNS

RECORD ALL INJURIES NO MATTER HOW TRIVIAL, WHETHER PATIENT LIVED OR DIED

(b) (6)

DETAILS OF SKULL FRACTURES AND BRAIN INJURY. DESCRIBE AND SHOW GRAPHICALLY.

1. ALL FRACTURES, BY TYPE (Simple, depressed, or indirect, etc.) 2. SITES OF BRAIN LESIONS, IF ANY. 3. DISLOCATIONS OF MANDIBLE.



MOR NO. 1 - 69 A	MODEL A/C CH - 46 D	BUND 153343	IDENTIFICATION OF INDIVIDUAL COPILOT
NAME OF INDIVIDUAL (b) (6)			SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SECTION F (Continued)

SKELETAL INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING
ALL FRACTURES BY TYPE (Simple, compound, comminuted, etc.) AND DISLOCATIONS INDICATING DIRECTION OF DISPLACEMENT.

(b) (6)

DESCRIBE AND SHOW GRAPHICALLY: 1. ALL FRACTURES OF SPINAL COLUMN (Simple, compressed, etc.)
2. DISLOCATION AND DIRECTION OF DISPLACEMENT. 3. SITES OF CORD DAMAGE, IF ANY.

DETAILS OF SPINAL INJURIES



NR NO. 1 - 69 A	MODEL A/C CH - 46 D	SUNG 153343	IDENTIFICATION OF INDIVIDUAL COPILOT
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NAME OF INDIVIDUAL

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

MEDICAL OFFICER'S REPORT OF ACCIDENT, INCIDENT, OR GROUND ACCIDENT — PAGE 5

OPNAV FORM 3750-8F (REV. 3-63)

OPNAV REPORT 3750-

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION G

ESCAPE, PERSONAL AND SURVIVAL EQUIPMENT

LIST AND CODE IN ACCORDANCE WITH SECTION G OF INSTRUCTION:

**PHASE CODES: A-ACCIDENT/MISHAP E-ESCAPE/EGRESS PHASE
S-SURVIVAL R-RESCUE PHASE**

1. EQUIPMENT DESCRIPTION INCLUDING SPECIFIC MODEL DESIGNATION	2. MODIFICATION	3. RE-REQUIRED	4. AVAIL-ABLE	5. NEED	6. USED	7. FAILED	8. REMARKS (Explain failures, loss, and/or difficulty encountered. Use additional 8x10 1/2 plain paper if needed.)
HELMET PROTECTIVE APH6 (98415-268-7797)		YES	A	A	A		VISOR OF HELMET BROKEN
COVERALLS, MENS FLYING NOMEX		YES	AESR	AES	A		
GLOVES, SHEEPSKIN FLYING (8415-904-5128)		YES	AESR	AES	A		
BOOTS COMBAT TYPE SURVIVAL KNIFE (96734D-098-4327)		YES YES	AESR AESR	AESR	A		
SHOULDER HARNESS AND LAP BELT		YES	A	A	A		
SEAT CUSHIONS		YES	A	A	A		
PEN GUN AND FLARES (1370-866-0788-x667)		YES YES					
FLASHLIGHT, PENLIGHT (966230-223-4547)		YES					
INDIVIDUAL SURVIVAL KIT (916545-611-0978)		YES					
							This equipment available, but not brought along on this flight.

SECTION H

NARRATIVE OF ESCAPE/EGRESS, SURVIVAL AND RESCUE PHASES

The copilot apparently removed his helmet and shoulder harness and seat belt following impact. He was found crouching in the cockpit facing the rear by Mr. Parsons. He was assisted out of the wreckage by Mr. Parsons and helped up to a nearby road. Mrs. Clanton was waiting there with her car and drove (b) (6) to Saint Josephs hospital, 1100 West Stewart Drive, California. He has no memory of these events.

MOR NO.	MODEL A/C	BUNO	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH - 46 D	153343	COPILOT

NAME OF INDIVIDUAL

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

OP-08F

☆ U. S. GOVERNMENT PRINTING OFFICE: 1963-698-423

MEDICAL OFFICER'S REPORT OF AN ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PAGE 6
OPNAV FORM 3750-8G (REV. 3-63)

OPNAV REPORT 3750-

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION I DETAILS OF ESCAPE/EGRESS/SURVIVAL PHASES REFER TO SECTION I OF INSTRUCTIONS

1. TOPOGRAPHY OF INDIVIDUAL'S LANDING SITE

☐ WATER ☒ LAND ☐ OTHER **Mountainous terrain - aircraft came to rest on side of slope.**

2. TYPE OF EGRESS

☐ EJECTION ☐ BAILOUT ☐ UNDERWATER ☐ NORMAL ☒ OTHER (State type) **Assisted out.**

S	E	REMARKS
		3. NOT ATTEMPTED
		4. ATTEMPTED
	<input checked="" type="checkbox"/>	5. ACCOMPLISHED
		6. THRU CANOPY
YES	NO	EGRESS DIFFICULTIES IF YES, EXPLAIN DIFFICULTIES
	<input checked="" type="checkbox"/>	7. PRIOR TO EGRESS
	<input checked="" type="checkbox"/>	8. DURING EGRESS
	<input checked="" type="checkbox"/>	9. SUBSEQUENT TO EGRESS

10. GIVE TYPE AND MODEL OF EJECTION SEAT USED	11. METHOD OF FIRING SEAT <input type="checkbox"/> PRIMARY <input type="checkbox"/> SECONDARY <input type="checkbox"/> OTHER	12. SEQUENCE OF EJECTION
---	---	--------------------------

13. POSITION OF SEAT ON EJECTION <input type="checkbox"/> UP <input type="checkbox"/> DOWN <input type="checkbox"/> FORWARD <input type="checkbox"/> AFT <input type="checkbox"/> OTHER	14. ATTITUDE OR MANEUVER OF A/C AT EXIT Lying on left side	15. AIRSPEED 0
--	--	--------------------------

16. ALTITUDE AT TIME OF EXIT (FEET) ABOVE SEA LEVEL 2600 ft. ABOVE TOPOGRAPHY 0	17. ALTITUDE OF PARACHUTE OPENING	18. WEIGHT
--	-----------------------------------	------------

19. TIME IN WATER	20. TIME IN RAFT	21. WIND VELOCITY	22. WAVE HEIGHT
-------------------	------------------	-------------------	-----------------

23. WAVE INTERVAL	24. AIR TEMPERATURE	25. WATER TEMPERATURE	26. VISIBILITY DUSK, CLEAR
-------------------	---------------------	-----------------------	--------------------------------------

27. ALERTING FACTORS VISUAL SIGHTING	30. NA
28. MEANS OF LOCATING ACCIDENT SITE VISUAL SIGHTING	31. ROUGH TERRAIN, MOUNTAINOUS
29. MEANS OF LOCATING SURVIVOR VISUAL SIGHTING	32. NA
	33. NA
	34. NA
	35. NA

36. DID INDIVIDUAL DEPART FROM LANDING SITE?
(If Yes, Explain reason and sequence up to rescue)

☐ NO ☒ YES **He was taken to Saint Josephs hospital by Mrs. Clanton**

SECTION J TRAINING FACTORS			
1. DATE OF LAST TRAINING	LPC	EJECTION TOWER	EJECTION SEAT
2. DID THE LACK OF TRAINING AND/OR EXPERIENCE PLAY A PART IN ANY PHASE OF THIS MISHAP? (If yes, explain)			
<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES			

MOR NO. 1 - 69 A	MODEL A/C CH - 46 D	BUNG 153343	IDENTIFICATION OF INDIVIDUAL COPILOT
----------------------------	-------------------------------	-----------------------	--

NAME OF INDIVIDUAL **(b) (6)**

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

OP-05F

MEDICAL OFFICER'S REPORT OF A/C ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PA

OPNAV REPORT 3750-7

OPNAV FORM 3750-8C (REV. 3-63)

SPECIAL HANDLING REQUIRED - See OPNAVINST 3750.6B for instructions.

SECTION F

PATHOLOGICAL DATA

(Refer to Section F of instructions.)

1. INJURY CODE AND DISPOSITION

A F

2. PRE-EXISTING PHYSICAL DEFECTS

NONE.

3. UNCONSCIOUSNESS

☐ NO ☐ YES DURATION:

4. DROWNED

☐

5. ASPHYXIATED

☐

6. SHOCK

☐ MILD

☐ MODERATE

☒ SEVERE

7. EXPOSURE

☐ MILD

☐ MODERATE

☐ SEVERE

8. EXTENT OF CARBONIZATION

NONE

9. IF ADMITTED TO SICK LIST, GIVE DIAGNOSIS

10. PLACE OF HOSPITALIZATION

11. GROUNDING IF YES, GIVE REASON

☐ NO ☐ YES

12. DURATION (See instruction)

13. PRIMARY CAUSE OF DEATH

(b) (6)

14. SECONDARY CAUSE OF DEATH

(b) (6)

15. AUTOPSY CONDUCTED BY:

☒ PATHOLOGIST, MEDICAL OFFICER PRESENT

☐ PATHOLOGIST, MEDICAL OFFICER NOT PRESENT

☐ MEDICAL OFFICER

16.

☐ PROTOCOL ATTACHED

☒ WILL BE FORWARDED

17. WAS "AUTOPSY MANUAL, NAVMED PS065" USED?

☐ YES ☒ NO

18. IF NO AUTOPSY CONDUCTED, GIVE REASON

19.

INJURIES

PHASE SUSTAINED

A E S R

CAUSE AND MECHANISM (If unknown, theorize)

(b) (6)

X

X

X

X

X

X

X

X

X

X

(b) (6)

20. REMARKS

MOR NO.

1 - 69 A

MODEL A/C

CH - 46 D

BUND

153343

IDENTIFICATION OF INDIVIDUAL

CREW CHIEF

NAME OF INDIVIDUAL

ABRAMS, Gale D.

SECTION F (Continued)

SURFACE INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING AND SHADING AFFECTED AREAS
ALL LACERATIONS, ABRASIONS, CONTUSIONS, PUNCTURE WOUNDS, SPRAINS AND BURNS

RECORD ALL INJURIES NO MATTER HOW TRIVIAL, WHETHER PATIENT LIVED OR DIED

(b) (6)

DETAILS OF SKULL FRACTURES AND BRAIN INJURY. DESCRIBE AND SHOW GRAPHICALLY.

1. ALL FRACTURES, BY TYPE (Simple, depressed, or indirect, etc.) 2. SITES OF BRAIN LESIONS, IF ANY. 3. DISLOCATIONS OF MANDIBLE.

(b) (6)

MOR NO.	MODEL A/C	BUNO	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH 46 D	153343	CREW CHIEF
NAME OF INDIVIDUAL			
ABRAMS, Gale D.			

OP-08P

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

U.S. GOVERNMENT PRINTING OFFICE: 1962-506227

SECTION F (Continued)

SKELETAL INJURIES

DESCRIBE AND SHOW GRAPHICALLY BY OUTLINING
ALL FRACTURES BY TYPE (Simple, compound, comminuted, etc.) AND DISLOCATIONS INDICATING DIRECTION OF DISPLACEMENT.

(b) (6)



DESCRIBE AND SHOW GRAPHICALLY: 1. ALL FRACTURES OF SPINAL COLUMN (Simple, compressed, etc.)
2. DISLOCATION AND DIRECTION OF DISPLACEMENT. 3. SITES OF CORD DAMAGE, IF ANY.

DETAILS OF SPINAL INJURIES

(b) (6)



MR NO. 1 - 69 A	MODEL A/C CH - 46 D	BUND 153343	IDENTIFICATION OF INDIVIDUAL CREW CHIEF
NAME OF INDIVIDUAL ABRAMS, GALE D.			
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MEDICAL OFFICER'S REPORT OF ACCIDENT, INCIDENT, OR GROUND ACCIDENT — PAGE 5

OPNAV REPORT 3750-7

OPNAV FORM 3750-8F (REV. 3-63)

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION G

ESCAPE, PERSONAL AND SURVIVAL EQUIPMENT

LIST AND CODE IN ACCORDANCE WITH SECTION 6 OF INSTRUCTION:

PHASE CODES: A-ACCIDENT/INSHAP E-ESCAPE/EGRESS PHASE
S-SURVIVAL R-RESCUE PHASE

1. EQUIPMENT DESCRIPTION INCLUDING SPECIFIC MODEL DESIGNATION	2. MODIFICATION	3. RE-REQUIRED	4. AVAIL-ABLE	5. NEED	6. USED	7. FAILED	8. REMARKS (Explain failures, loss, and/or difficulty encountered. Use additional 8x10 1/2 plain paper if needed.)
HELMET, PROTECTIVE APH6(98415-268-7797)		YES	A	A	A		
COVERALLS, MENS FLYING, NOMEX GLOVES, SHEEPSKIN FLYING(8415-904-5128)		YES	A	A	A		
BOOTS COMBAT TYPE SURVIVAL KNIFE (96743D-098-4327)		YES	A	A	A		
LAP BELT AND GUNN- ERS BELT PEN GUN AND FLARES (1370-866-0788-X667)		YES	A	A			
FLASHLIGHT, PENLIGHT (966230-223-4547)		YES					
INDIVIDUAL SURVIVAL KIT (9L6545-611- 0978)		YES					
							DID NOT USE SEAT BELT OR GUNNERS BELT. This equipment available, but not brought along on this flight

SECTION H

NARRATIVE OF ESCAPE/EGRESS, SURVIVAL AND RESCUE PHASES

PATIENT WAS KILLED ON IMPACT. BODY WAS REMOVED BY SILVERADO VOLUNTEER FIRE DEPARTMENT.

MOR NO.	MODEL A/C	BUNG	IDENTIFICATION OF INDIVIDUAL
1 - 69 A	CH - 46 D	153343	CRENCHIEF

NAME OF INDIVIDUAL

ABRAMS, Gale D.

OP-05F

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6E
☆ U. S. GOVERNMENT PRINTING OFFICE: 1963-698-425

MEDICAL OFFICER'S REPORT OF A/ACCIDENT, INCIDENT, OR GROUND ACCIDENT - PAGE 6

OPNAV REPORT 3750.7

OPNAV FORM 3750-80 (REV. 2-63)

SPECIAL HANDLING REQUIRED. See OPNAV INST 3750.6E for instructions

SECTION I DETAILS OF ESCAPE/EGRESS/SURVIVAL PHASES REFER TO SECTION I OF INSTRUCTIONS

1. TOPOGRAPHY OF INDIVIDUAL'S LANDING SITE

☐ WATER ☒ LAND ☐ OTHER

2. TYPE OF EGRESS

☐ EJECTION ☐ BAILOUT ☐ UNDERWATER ☐ NORMAL ☐ OTHER (State type)

S	E	REMARKS
<input checked="" type="checkbox"/>		3. NOT ATTEMPTED
		4. ATTEMPTED
		5. ACCOMPLISHED
		6. THRU CANOPY
YES	NO	EGRESS DIFFICULTIES IF YES, EXPLAIN DIFFICULTIES
		7. PRIOR TO EGRESS
		8. DURING EGRESS
		9. SUBSEQUENT TO EGRESS

10. GIVE TYPE AND MODEL OF EJECTION SEAT USED 11. METHOD OF FIRING SEAT ☐ PRIMARY ☐ SECONDARY ☐ OTHER 12. SEQUENCE OF EJECTION

13. POSITION OF SEAT ON EJECTION ☐ UP ☐ DOWN ☐ FORWARD ☐ AFT ☐ OTHER 14. ATTITUDE OR MANEUVER OF A/C AT EXIT 15. AIRSPEED

16. ALTITUDE AT TIME OF EXIT (FEET) ABOVE SEA LEVEL 2600 ft. ABOVE TOPOGRAPHY 0 17. ALTITUDE OF PARACHUTE OPENING 18. WEIGHT

19. TIME IN WATER 20. TIME IN RAFT 21. WIND VELOCITY 22. WAVE HEIGHT

23. WAVE INTERVAL 24. AIR TEMPERATURE 25. WATER TEMPERATURE 26. VISIBILITY

27. ALERTING FACTORS	30.
VISUAL SIGHTING	NA
	31.
	NA
28. MEANS OF LOCATING ACCIDENT SITE	32.
VISUAL SIGHTING	NA
	33.
	NA
29. MEANS OF LOCATING SURVIVOR	34.
VISUAL SIGHTING	NA
	35.
	NA

36. DID INDIVIDUAL DEPART FROM LANDING SITE? (If Yes, Explain reason and sequence up to rescue)

☒ NO ☐ YES

SECTION J TRAINING FACTORS

1. DATE OF LAST TRAINING

LPC EJECTION TOWER EJECTION SEAT SURVIVAL

2. DID THE LACK OF TRAINING AND/OR EXPERIENCE PLAY A PART IN ANY PHASE OF THIS MISAP? (If yes, explain)

☒ NO ☐ YES

WOR NO. 1 - 69 A MODEL A/C CH 46 D BUNO 153343 IDENTIFICATION OF INDIVIDUAL CREW CHIEF

NAME OF INDIVIDUAL

ABRAMS, Gale D.

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.5 SERIES

INDEX OF MOR 1 - 69 A ENCLOSURES

1. Narrative account of mishap.
2. Statement of 1/LT (b) (6)
3. Statement of Mr. Roger Parsons.
4. Statement of Mr. Glenn Clanton.
5. Statement of Mrs. Glenn Clanton.
6. Account of damage to cockpit area.
7. Diagram of seating arrangement.
8. Picture of wreckage, side view.
9. Picture of wreckage, front view.
10. Picture of pilots seat in wreckage and position of body.
11. Picture of pilots seat in wreckage.
12. Picture of rear cabin compartment and position of crew chiefs body.
13. Picture of left side of cockpit.
14. Picture of pilots and copilots seats, front view.
15. Picture of pilots and copilots seats, rear view.
16. MOR Summary and Conclusions.
17. MOR Recommendations.
18. AAR Conclusions.
19. AAR Recommendations.

HMMT 302 MOR 1-69 A, dtd; 2 Jul 68,

PILOT BAGWELL

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

THE ACCOUNT

PART V THE ACCIDENT

At 1830, on the evening of 2 July 1968, SQ-3 (BuNo 153343) took off from the Marine Corps Air Facility located in Santa Ana, California. The flight was scheduled for three hours, and was to consist of 1.5 hours of general review and 1.5 hours of night tactics (Enclosure 2). The first half of the hop was uneventful, and was conducted as scheduled - mostly practice on those maneuvers in which the pilot under instruction was less than proficient (precision landings, running landings, etc.). For the first half of the hop, SQ-3 did not leave the home field traffic pattern. At approximately 1950, SQ-3 refueled at the Air Facility at which time the pilots were informed that their wingman's aircraft would not be joining them for the second half of the flight (night tactics), due to mechanical difficulties. Major BAGWELL, the Aircraft Commander, decided that they would proceed singly into the Confined Area Landing Sites and concentrate the remaining portion of the flight on night confined area landings. They departed the Air Facility at approximately 2000 and proceeded directly to Confined Area Landing Site #3, located approximately eight miles north of MCAS El Toro, California. This site is approximately 2000 feet MSL. They made three left-hand approaches and landings to Site #3, then decided to practice right hand approaches. A right hand approach to Site #3 necessitates a fairly steep glide slope because of mountain ridges on the flight path. As SQ-3 approached a high 90 degree position, 51 inches of the AFT yellow blade separated from the rest of the rotor blade. The co-pilot's statement indicates that no unusual vibration or imbalance was apparent throughout the approach (Enclosure 3). As they approached the landing zone the aft pylon separated from the fuselage at Water Line +71, and carried away the aft vertical drive shaft and rotor system. The nose pitched up due to loss of the aft rotor system until ground contact in a near vertical attitude.

The crew chief was fatally injured during initial impact. The aircraft commander was fatally injured in the secondary impact, and the pilot under instruction sustained major injuries.

The initial impact of the aircraft (minus the vertical shaft, aft pylon and rotor head) was in a tail-low near vertical attitude. The cabin and cockpit sections broke away on initial impact, and secondary impact occurred as the cabin and cockpit sections recoiled with forward momentum striking the left side of the cockpit and then fell back on its left side. Initial impact of the vertical shaft, aft pylon and rotor head occurred approximately 140 feet from the main fuselage (Enclosure 4a).

A fire occurred in the section aft of the cockpit and cabin area. The engines, aft transmission, and aft portion of the cabin were almost completely consumed by the fire. The cabin and cockpit areas forward of approximately Station 350 completely escaped the fire (Enclosure 4b). The aft pylon, vertical shaft and aft rotor section did not burn (enclosure 4c).

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with OPNAVINST 3750.6 Series

STATEMENT OF FIRST LIEUTENANT (b) (6)
CONCERNING HHMT-302 AND 1-69, OCCURRING 2 July 1968

USMC

We took off from home field about 1830 on 2 July 1968 on what was to be a three hour Review/Tactics hop. This was my first flight with Major BAGWELL, but I was not nervous or anxious about flying with the Major because everyone had told me that he was an excellent pilot and a nice guy.

We stayed at home field for the first part of the hop. We worked on touch and go landings and did a few SAS-off approaches, mainly just smoothing out a few rough spots. It was a fairly good hop from my point of view with no major problems with control. The helicopter did have a slight vertical vibration, but nothing out of the ordinary.

We landed for refueling at about 1950. The second part of the hop was scheduled to be a tactics hop, but the other aircraft was downed. We then decided to go to Site #3 to practice confined area landings. We took off at about 2000 and proceeded directly to Site #3. I then made three left-hand approaches to Site #3 with no major problems. As we took off after the third touch and go, Major BAGWELL asked if I had ever made a right hand approach. I answered in the negative, so he told me to try one. He said that I would lose sight of the landing zone for a short period during the approach. As I made the right hand loop over the crest of the mountain, I did lose sight of the landing zone. At about this time, Major BAGWELL said that I was a little high. I then took off some power, but don't recall exactly how much. Up to this time everything had been smooth. I noted no abnormal vibrations or other problems. At the 90-degree position, I estimate that we were at about 300 feet AGL and about 55 knots airspeed. I felt the nose of the helicopter gradually rise and felt Major BAGWELL on the controls, but the Major did not say anything. The nose gradually went up to about 90 degrees nose up, and the aircraft began to shudder. After that I am not sure what happened. (b) (5)

I saw the ground coming up at me, but do not remember the impact at all. The next thing that I remember is standing on a road next to someone's car. The ride to the hospital is vague in my memory.

/s/ (b) (6)

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(b) (6)

STATEMENT OF MR. ROGER PARSONS: EMPLOYEE OF MR. CLANTON, A WITNESS TO THE ACCIDENT, AND ONE OF THE FIRST PERSONS ON THE SCENE.

I live on the "Hidden Ranch" in Black Star Canyon owned by Mr. Glenn Clanton. On the evening of 2 July 1968 at approximately 8:25 p.m. I was watching television with Mrs. Clanton and her daughter. I am able to pinpoint this time pretty well because we were waiting for an 8:30 program which had not started yet. We heard an unusual noise emanating from a helicopter outside the house. It was unusual enough that all of us in the house got up to see what was wrong. The noise sounded like four or five bursts of a clattering noise, like putting a stick in a fan. We then heard Mr. Clanton call "One of them is going in". We ran outside, heard the impact and saw a cloud of dust and black smoke. I did not see the helicopter in flight. Mr. Clanton got into his car and rushed to the crash site, and I followed in my pickup truck about 1 or 2 minutes behind.

I arrived at the crash site at about 8:30 p.m. I stayed at the crash site and got out of my truck. The rear section of the helicopter was burning. As I started down the hill towards the helicopter, I heard an explosion from the rear of the craft, and therefore circled around the front of the cockpit area and approached it. I called into the cockpit area, "Is anyone in there?" I heard someone moaning and call "Help, get me out of here." The helicopter was laying on its left side, so I climbed up to the right hand window, and saw someone in the cockpit area, crouching facing the rear. He was out of the seat, which had pulled loose from its moorings, and was also free from his seat belt and shoulder harness. His helmet was off. I asked him if he was hurt, and he answered "My left arm hurts". I then assisted him out of the cockpit and started up the hill, supporting him. He was unable to make it up the crest of the hill so I said "lets rest awhile". The injured man said "No, no we have to get away, we're not far enough away." We then moved down the draw away from the crash site. We then proceeded up to the road where Mrs. Clanton was waiting with her car. I assisted him into the car and asked if there were any more aboard; he answered "Two": I then took a fire extinguisher from my pickup as the brush was burning and proceeded back down to the crash site. I climbed back up and looked into the cockpit. I saw two helmets, one was lying free in the cockpit, and the other was still on a second man. I then removed the seat which was lying on top of the body and placed it on the side of the helicopter. I went into the cockpit and determined that the second man was dead. He was strapped into this seat with his helmet on. He was lying on his left side and appeared to be impinged between the seat and the side of the helicopter, and the back of the seat was crumpled. I then climbed out of the cockpit and expended my fire extinguisher on the brush fire. I then climbed into the rear section and saw a second body. I went up to the body and determined that he also was dead.

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Enclosure (3)

The body was lying on the right side with the head to the rear. His helmet was on but he had no seat belt or restraining belt of any kind. The back of the rear compartment was burning. I found a fire extinguisher and sprayed the fire, but was unable to put out the fire. I then sprayed the body of the crew chief to keep it from burning. I then climbed out of the helicopter and expended the fire extinguisher on the brush fire.

The Silverado volunteer fire department then arrived and removed the bodies. I then stood aside and let the authorities take over.

/s/ Mr. ROGER PARSONS

Mr. Roger PARSONS is considered to be a credible witness although he has had no aeronautical experience.

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(b) (6)

STATEMENT OF MR. GLENN CLANTON: OWNER OF A RANCH LOCATED APPROXIMATELY ONE-HALF MILE FROM THE CRASH SITE. A WITNESS TO THE ACCIDENT.

I live on "Hidden Ranch", which is located in Black Star Canyon, Orange County, California (map location AMS Series V895, 1 SW, coordinates 397406). The post office address is P.O. Box #91, Silverado, California. My ranch is located near a helicopter landing site (coordinates 392398) used by Marine Corps helicopters which I understand is known as Site #3. I observe Marine helicopters making numerous landings at Site #3 almost every day since I live near the site, and their landing approach pattern often brings them fairly close to my house.

On the evening of 2 July 1968, at approximately 8:25 p.m., I was in my front yard tending the flowers that surround the front of my house. While watering the flowers, I observed a large Marine helicopter with two main rotors in tandem making landings at Site #3. The helicopter made two or three left hand approaches to the site, then apparently was going to make an approach from the other direction (right hand approach). I observed him in a wide looping approach which took him over a ravine, everything appeared to be normal; the aircraft appeared to be in a normal attitude, and there were no unusual noises emanating from the aircraft. As the approach continued, and as they approached the landing zone, the rate of descent was increased, and all noise from the aircraft ceased. The helicopter descended out of my line of sight, and I called into the house to my wife and daughter and Mr. PARSONS, "One of them is going in". I heard the impact of the helicopter hitting the ground, although there was no explosion upon impact. I also saw a cloud of dust rise from the area and also a cloud of black smoke. I did not see the actual impact. I jumped into my car and drove the approximate half-mile to the crash site. The helicopter had crashed only about ten feet from the road and I stopped and thought that everyone aboard must be dead and noticed the fires starting, so I drove straight to the Silverado Fire Department to notify them. I told them to contact the Marine Base before they left for the crash scene, which I don't think they did. I then returned to the crash site myself, and met my wife and daughter driving down the hill towards the hospital with the injured co-pilot. They continued on to the hospital, and I returned to the crash scene.

 /s/ GLENN CLANTON

Mr. Glenn CLANTON is considered to be a credible witness although he has had no aeronautical experience.

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(b) (6)

Enclosure (7)

**STATEMENT OF MRS. GLENN CLANTON: WIFE OF MR. GLENN CLANTON AND
A WITNESS TO THE ACCIDENT.**

I live with my husband and daughter at P.O. Box #91, Silverado, Calif. (Hidden Ranch). On Tuesday night, July 2, 1968, my daughter, Roger Parsons and I were watching television. My husband was in the front yard working on the lawn. We are quite accustomed to hearing helicopters as our home is fairly close to a landing area that the helicopters from the Marine base use for practice. At slightly before 8:30, we heard a helicopter making an unusual noise outside. As we stood up to go outside to investigate, Glenn called out, "One of them is going down." We all ran outside and could see the area where the helicopter crashed, although we couldn't see the helicopter from the front yard. Glenn got into his car and drove towards the crash, and Roger followed in his truck. About three or four minutes later we (my daughter and I) heard an explosion from the crash area and fearing that Roger and Glenn might have been hurt, drove to the crash site. By the time we got there, Roger was helping the survivor to the road. He had some pretty bad cuts on his face and was somewhat incoherent. We put him in our car and started down the hill hoping to meet an ambulance on the way. As we proceeded down the hill, we passed numerous emergency vehicles, but they were in such a hurry to get to the crash that they wouldn't stop for us, so we continued towards Santa Ana and a hospital. The injured man mumbled over and over a desire to get to a hospital. Enroute to the hospital we were able to flag down a policeman who provided us with an escort to St. Joseph's Hospital in Santa Ana,

/s/ MRS. GLENN CLANTON

Mrs. Glenn CLANTON is considered to be a credible witness although she has had no aeronautical experience.

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(b) (6)

Enclosure (5)

DAMAGE TO THE COCKPIT AREA OF SQ-3

The cockpit section had damage on the left side from the nose around to and including the forward cabin window (Station 59 to Station 160). The forward window frame (cockpit side window, Station 59) is broken at the deck (W.L. -15), middle (W.L. 15) and at the top (W.L. 44). The entire outer floor section, from forward of the cockpit side window (Station 59) to the bulkhead just aft of the pilot's seat (Station 101) below water line -15 is crushed and broken. Both collectives are broken off at the bottom end. The wind screen in front of the left seat is in place but broken in two places (it is believed that the heads of both pilots hit this window sometime during the impact sequence). The overhead circuit breaker panel is bent and broken loose from the overhead. The instrument panel is bent and broken on the left side and center. The right side of the panel is relatively undamaged. The center console, forward of the engine condition levers, is bent to the left from the deck up and the portion containing the crossfeed and hover off switches and the SAS controls is crushed inward from the top (Enclosures 4g and h).

The right cockpit deck is undamaged. The left cockpit deck, forward of the seat is crumpled inward. The right seat deck track is undamaged. The right seat has some bending and twisting and has impact marks on the left side of the back and forward edge of the seat pan. Both outboard channel guides on the right side of the right seat are broken. All of the channel guides on the left channel show bending and are abnormally separated. The seat belts of both seats were undamaged.

The left seat deck tracks are intact and appear to be undamaged (Enclosure 4i). The left seat bucket assembly is bent forward and is twisted down and to the right. The seat back has pronounced 45° buckles from upper right to lower left and is twisted from right to left. The left edge of the seat back is bent in eight inches from the top. The joint between the seat back and bucket assembly on the right side has two, two-inch cracks. The left joint is torn and partially crushed (the board suspects that the seat belt attaching mechanism caused this as a result of impact with the lefthand pilot's escape hatch handle), (Enclosure 4j). Both outboard guides of the seat's right channel are broken off. The aft outboard guide of the right channel is intact but scrooped. The forward outboard channel guide is cracked and somewhat bent but still connected.

Note: The above is an excerpt from the AAR summary of aircraft damage. The enclosure numbers pertain to HMMT-302 AAR 1-69A.

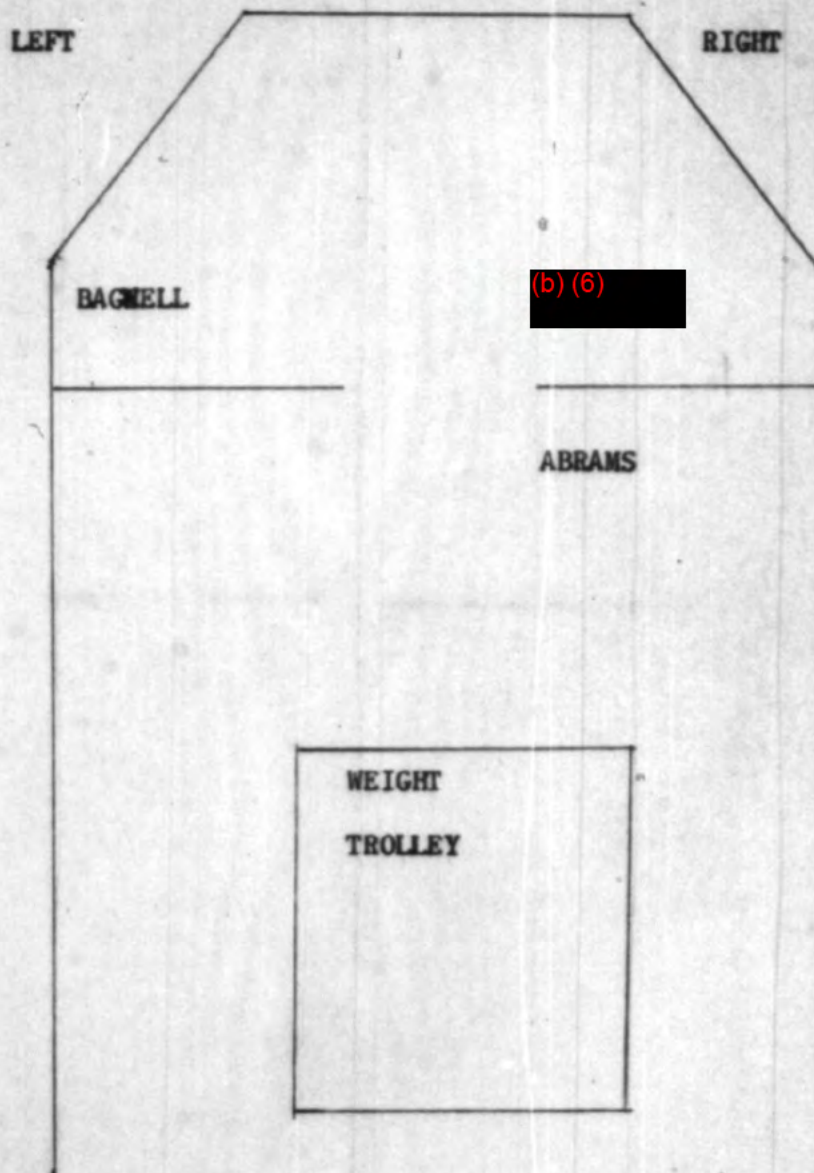
HMMT 302, MOR 1-69 A, dtd; 2 Jul 68 BUNO 153343,

PILOT BAGWELL

ENCLOSURE # 6

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

DIAGRAM OF SEATING ARRANGEMENT



HMMT 302, MOR 1-69 A, dtd; 2 Jul 68 BUNO 153343, PILOT BAGWELL

ENCLOSURE #7

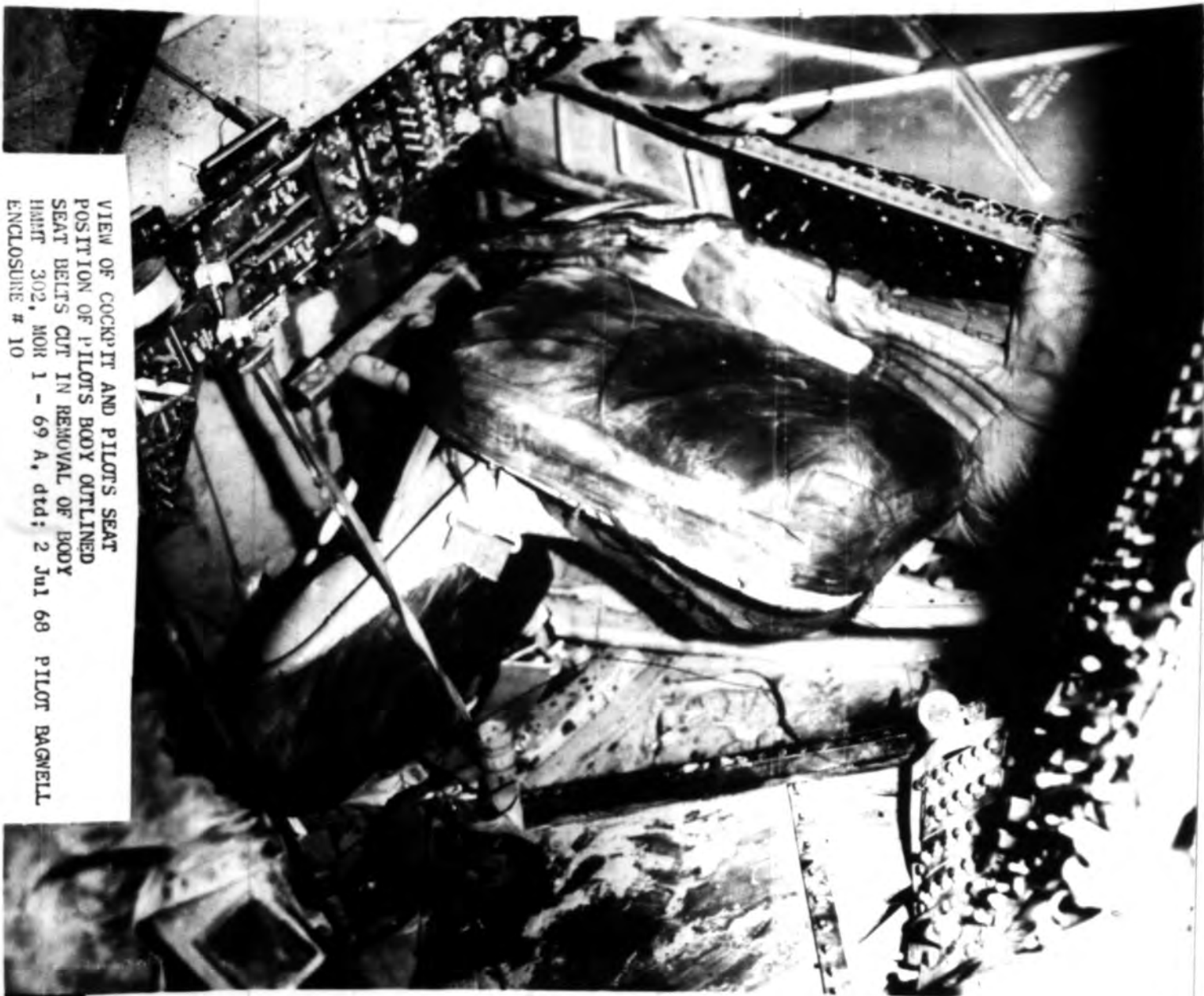
SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES



SIDE VIEW CH -46 D BUNO 153343
HEMT 302 MOR 1 - 69 A dtd, 2 Jul 68 PILOT BAGWELL
ENCLOSURE # 8




FRONT VIEW CH - 46 D BUINO 153343
UNIT 302, MOR 1 - 69 A, dtd: 2 Jul 60 PILOT MAGWELL
ENCLOSURE # 9



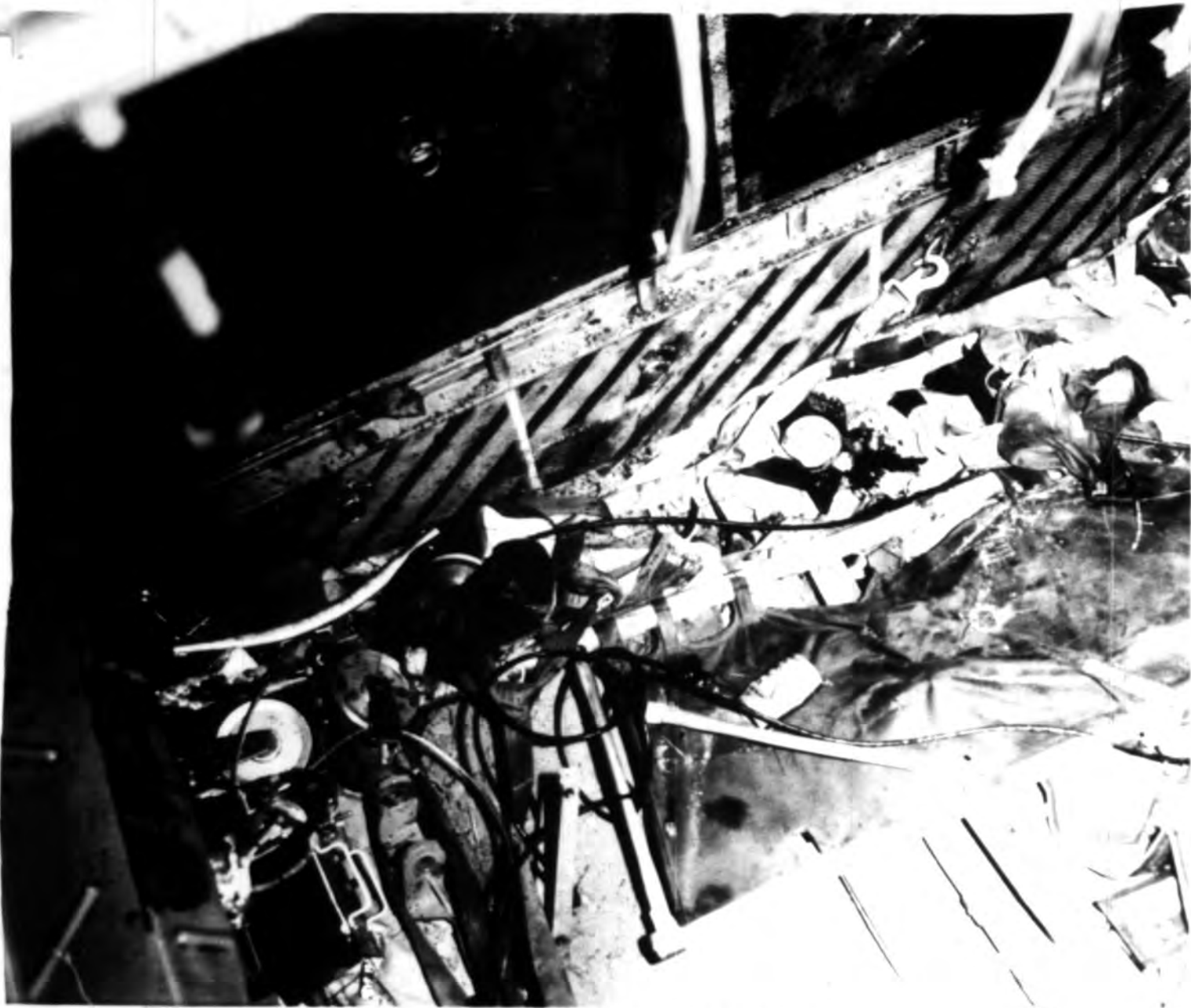
VIEW OF COCKPIT AND PILOT'S SEAT
POSITION OF PILOT'S BODY OUTLINED
SEAT BELTS CUT IN REMOVAL OF BODY
HMMT 302, MOR 1 - 69 A, dtd: 2 Jul 68 PILOT BAGWELL
ENCLOSURE # 10

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH PARAVINST 37



VIEW OF COCKPIT SHOWING PILOTS SEAT
HMMT 302, MOR 1 - 69 A, dtd: 2 Jul 68 PILOT MAGNELL
ENCLOSURE # 11

SPECIAL HANDLING REQUIRED WHEN AIRBORNE



VIEW OF REAR CABIN COMPARTMENT TAKEN THROUGH RIGHT DOOR LOOKING DOWN AT LEFT SIDE
POSITION OF CREW CHIEFS BODY OUTLINED
HMMT 302, MOR 1-69 A, dtd: 2 Jul 68, PILOT BAGWELL
ENCLOSURE 12

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3700.7

SECTION 9.0572 1750.6 SEE ENCL 11 WITH OPERATING INSTRUCTIONS



VIEW LEFT SIDE OF COCKPIT AFTER WRECKAGE WAS RIGHTED AND PILOTS SEAT REMOVED
HMMF 302, MOR 1-69 A, dtd: 2 Jul 68 PILOT BAGWELL
ENCLOSURE # 13

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

FRONT VIEW OF SEATS, PILOTS SEAT ON RIGHT
HMMT 302, MOR 1 - 69 A, dtd: 2 Jul 68, PILOT BAGWELL
ENCLOSURE # 14





REAR VIEW OF SEATS, PILOTS SEAT ON LEFT
HUNT 302, MOR 1 - 69 A, dtd; 2 Jul 68 PILOT BAGWELL
ENCLOSURE # 15



REAR VIEW OF SEATS, PILOTS SEAT ON LEFT
HUNT 302, MOR 1 - 69 A, dtd; 2 Jul 68 PILOT BAGWELL
ENCLOSURE # 15

SUMMARY AND CONCLUSIONS TO MOR 1-69 A

On 2 Jul 68 at 2025 T a CH - 46 D, BUNO 153343 crashed in Blackstar Canyon, Orange county, California at 305 degrees 8NM El Toro TACAN. The aircraft was piloted by L.L. Bagwell Major USMC, copiloted by (b) (6) 1/LT USMCR and G.D. Abrams Cpl USMC was the crew chief. No other personnel were aboard. The aircraft sustained strike damage, the pilot and crew chief were killed and the copilot sustained major injuries.

The primary cause of the accident assigned by the Accident Board was material failure. Contributing causes assigned by the Accident Board were maintenance supervisory personnel and NARF North Island radiographic personnel. See MOR enclosure #18 AAR conclusions. No pilot error was involved.

Following separation of the aft rotor system the aircraft made initial impact with the ground in a near vertical position striking aft end first. The aircraft then rebounded forward making secondary impact striking the left corner of the cockpit area coming to rest on the left side.

It is my opinion that on initial impact the crew chief was thrown aft from his seat (see diagram of seating arrangement MOR enclosure #7) striking a trolley of internal training weights secured in the mid portion of the rear cabin compartment. He sustained bilateral femoral fractures and a severe flexion force to the head and neck causing his fatal injuries. His body was thrown forward on the secondary impact coming to rest along the lateral portion of the compartment facing aft. I feel that had the crew chief been wearing a seat belt he would have sustained only minor injuries.

With the secondary impact both the pilots and copilots seats were torn loose from their moorings and thrown forward and to the left, the men remaining securely strapped in and attached to the seats. Both the pilots and copilots heads struck the left cockpit windshield. As the side of the cockpit struck the ground the copilots seat struck the pilots seat. The pilot was impinged between his seat and the frame of the left cockpit door sustaining a fatal crush injury to the left chest. As the copilots seat struck the pilots seat the copilot sustained (b) (6) (b) (6) and was thrown into the windshield striking his face (b) (6). Neither the pilot or copilot had their visors down. The copilots visor was shattered when he struck the windshield, otherwise the helmets were intact. Both pilot and copilot were wearing seat belts and shoulder harnesses which were secured and did not fail.

The major factor in the fatal injury to the pilot and the major injuries to the copilot was the failure of the seat moorings. If the seats had held I feel the pilot would possibly have survived and the copilot would have sustained only minor injuries if any at all.

The rescue phase for the copilot was uneventful, see statement of Mr. Roger Parsons MOR enclosure #3.

HMMT 302, MOR 1 - 69 A, dtd; 2 Jul 68 BUNO 153343

PILOT BAGWELL

ENCLOSURE # 16

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

RECOMMENDATIONS TO MOR 1 - 69 A

1. A method of mooring the pilots and copilots seats should be developed so that they can withstand forces equal to or greater than the capability of the seat belt and shoulder harness.
2. A method of restraint should be developed for protection of the crew chief, which allows performance of his duties while affording him protection in event of a crash.
3. The double visor modification kit APH6 should be implemented for all aviators as soon as possible, and personnel should be instructed to have their visors down at all times while in a landing pattern.
4. Although not a factor in this accident, all personnel should have their personal survival gear along at all times while flying.

HMMT 302, MOR 1-69 A, djd; 2 Jul 68 BUNO 153343, PILOT BAGWELL

ENCLOSURE # 17

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

PART VIII CONCLUSIONS

1. That material failure of the aft yellow rotor blade (Ser No. A-2-668) was the primary cause factor.
2. That the failure of the radiographic personnel at NARP North Island to properly interpret the X-ray film taken of this blade 25 July 1967 was a contributing cause factor.
3. That the failure of maintenance supervisory personnel to ensure that this particular rotor blade had been inspected at the proper time in accordance with H-46 IAFB 103 Rev. B was a contributing cause factor.
4. That pilot error was not a factor.
5. That the injuries sustained by the pilots were primarily caused by the fact that their seats broke loose from the deck tracks.
6. That the fatal injuries received by the crew chief resulted from the fact that he was not strapped in by a seat belt at the time of impact.
7. That neither X-ray nor eddy current inspection of H-46 rotor blades provides sufficient assurance of detection of spar defects prior to failure in flight.
8. That, although not a factor in this accident, a need exists for detailed instructions to be made available to operating activities concerning the proper security of cargo and vehicles in the CH-46.

Special Handling Required in Accordance
with ORNL-TR-3750.6 Series

PART IX RECOMMENDATIONS

1. That squadron maintenance control procedures be reviewed to assure that required inspections are accomplished at prescribed intervals on all aircraft and/or components.
2. That urgent priority be assigned to the development of an integral blade inspection system for the existing rotor blades or that new blades be designed to incorporate such a system.
3. That, as an interim to an integral blade inspection system, X-ray and eddy current inspections be replaced by an inspection device and/or method to assure timely detection of rotor blade spar defects prior to an inflight failure.
4. That urgent and immediate action be initiated to ensure the development and incorporation of pilot's seats with sufficient strength to withstand lateral, axial and vertical forces equal to or greater than the forces the seat belt and shoulder harness can withstand.
5. That Section IX of the NATOPS Flight Manual be modified to reflect that the crew chief will be seated and secured by a seat belt during all takeoffs and landings except when his duties require him to check the clearance of the aft rotor and/or landing gear. Whenever the crew chief's duties require that he leave his seat in flight he will, whenever possible be secured by a gunners belt. Subject recommendation will be submitted in accordance with OPHAVINST 3510.9 series.
6. That information similar to that contained in the CH-53 cargo loading manual (NAVAIR 01-230 HMA-9), be incorporated in the H-46 NATOPS/Flight Manuals (NAVAIR 01-250 HDB-1). Subject recommendation will be submitted in accordance with OPHAVINST 3510.9 series.

Special Handling Required in Accordance
with OPHAVINST 3750.6 Series

MARINE MEDIUM HELICOPTER TRAINING SQUADRON 302
Marine Helicopter Training Group 30
3d Marine Aircraft Wing, FMFPac
Marine Corps Air Facility
Santa Ana, California 92709

FLIGHT SCHEDULE FOR:
OPERATIONS DUTY OFFICER:
SQUADRON DUTY OFFICER:
POST MAINTENANCE INSPECTION PILOT:
POST MAINTENANCE INSPECTION CO-PILOT:
SYLLABUS HOURS LAST MONTH: 767.6
DUTY SECTION: 4

2 JULY 1968
LT (b) (6)
LT (b) (6)
MAJ (b) (6)
LT (b) (6) / LT (b) (6)
HOURS LAST MONTH: 927
HOURS SCHEDULED: 48.0
PHASE: NEW MO

	FLT									FLT
INDEX	NO.	BRIEF	ETD	ETR	PILOT	CO-PILOT	MISSION	WT	TIME	
3Q	1500	0900	1000	1300	MAJ (b) (6)	(b) (6)	IIT	----		
3Q	1510	"	"	"	MAJ (b) (6)	LTCOL (b) (6)	PAM 2/3	----		
3Q	1520	"	"	"	(b) (6)	MAJ (b) (6)	PAM 3/4	----		
3Q	1530	"	"	"	(b) (6)	MAJ (b) (6)	PAM 1	----		
3Q	1540	"	"	"	(b) (6)	(b) (6)	PAM 4/5	----		
3Q	1550	"	"	"	(b) (6)	(b) (6)	CAL 1/NAV 2	2800		
3Q	1560	"	"	"	(b) (6)	(b) (6)	INST 6 A/B	2800		
3Q	1570	"	"	"	(b) (6)	(b) (6)	PAM 10/INST 1	2800		
3Q	1580	1730	1830	2130	MAJ (b) (6)	(b) (6)	REV/CAL 6	2800		
3Q	1590	"	"	"	(b) (6)	(b) (6)	REV/NFORM 1	2800		
3Q	1592	"	"	"	(b) (6)	(b) (6)	REV/NFORM 1	2800		
3Q	1600	"	"	"	(b) (6)	(b) (6)	INST 5	----		
3Q	1610	"	"	"	(b) (6)	(b) (6)	PCLP/CAL 6	2800		
3Q	1620	"	"	"	MAJ (b) (6)	(b) (6)	INST 6A/B	----		
3Q	1630	"	"	"	MAJ BAGWELL	(b) (6)	REV/TAC 4	2800		
3Q	1632	"	"	"	MAJ (b) (6)	(b) (6)	REV/TAC 4	2800		
3Q	1640	TBA	TBA	COMP	MAJ (b) (6)	(b) (6)	PMIP			
3Q	1650	"	"	"	(b) (6)	(b) (6)	"			
3Q	1660	"	"	"	(b) (6)	(b) (6)	"			
3Q	1670	"	"	"	(b) (6)	(b) (6)	"			

- NOTES:**
1. APM-0030.
 2. REMINDER ANNUAL FLIGHT TIME REPORTS DUE THIS FRIDAY.
- NOTES:**
3. THERE ARE _____ IN EACH ENGINE COMPARTMENT THAT WILL ILLUMINATE A CORRESPONDING FIRE PULL HANDLE IF THE PRESENCE OF FIRE IS DETECTED.
 4. 0745 MUSTER ALL OFFICER'S AT THE GYM IN ATHLETIC GEAR.

"SPECIAL HANDLING REQUIRED
 IN ACCORDANCE WITH ORNAVINST
 3750.6 SERIES".

/s/ (b) (6)
 By direction

(b) (6)
 CERTIFIED A TRUE COPY
 Enclosure (2)

STATEMENT OF FIRST LIEUTENANT (b) (6)
CONCERNING HHT-302 APR 1-69, OCCURRING 2 July 1968

USMC

We took off from home field about 1830 on 2 July 1968 on what was to be a three hour Review/Tactics hop. This was my first flight with Major BAGWELL, but I was not nervous or anxious about flying with the Major because everyone had told me that he was an excellent pilot and a nice guy.

We stayed at home field for the first part of the hop. We worked on touch and go landings and did a few SAS-off approaches, mainly just smoothing out a few rough spots. It was a fairly good hop from my point of view with no major problems with control. The helicopter did have a slight vertical vibration, but nothing out of the ordinary.

We landed for refueling at about 1950. The second part of the hop was scheduled to be a tactics hop, but the other aircraft was downed. We then decided to go to Site #3 to practice confined area landings. We took off at about 2000 and proceeded directly to Site #3. I then made three left-hand approaches to Site #3 with no major problems. As we took off after the third touch and go, Major BAGWELL asked if I had ever made a right hand approach. I answered in the negative, so he told me to try one. He said that I would lose sight of the landing zone for a short period during the approach. As I made the right hand loop over the crest of the mountain, I did lose sight of the landing zone. At about this time, Major BAGWELL said that I was a little high. I then took off some power, but don't recall exactly how much. Up to this time everything had been smooth. I noted no abnormal vibrations or other problems. At the 90-degree position, I estimate that we were at about 300 feet AGL and about 55 knots airspeed. I felt the nose of the helicopter gradually rise and felt Major BAGWELL on the controls, but the Major did not say anything. The nose gradually went up to about 90 degrees nose up, and the aircraft began to shudder. After that I am not sure what happened. (b) (5)

I saw the ground coming up at me, but do not remember the impact at all. The next thing that I remember is standing on a road next to someone's car. The ride to the hospital is vague in my memory.

/s/ (b) (6)

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with OPNAVINST 3750.6 Series

Certified A True Copy

(b) (6)

BLANK STAR CANYON, CALIF.

SPECIAL HANDLING REQUIRED IN EXTREMES
WITH OPNAVINST 3750.6 SERIES

2710

BLANK STAR CANYON

2300

CANYON

BM Hidden Ranch

2000

SPECIAL HANDLING REQUIRED IN EXTREMES
WITH OPNAVINST 3750.6 SERIES

2100

1906

AFT YELLOW BLADE

AFT UPPER
PYLON

400 METERS

140 FT

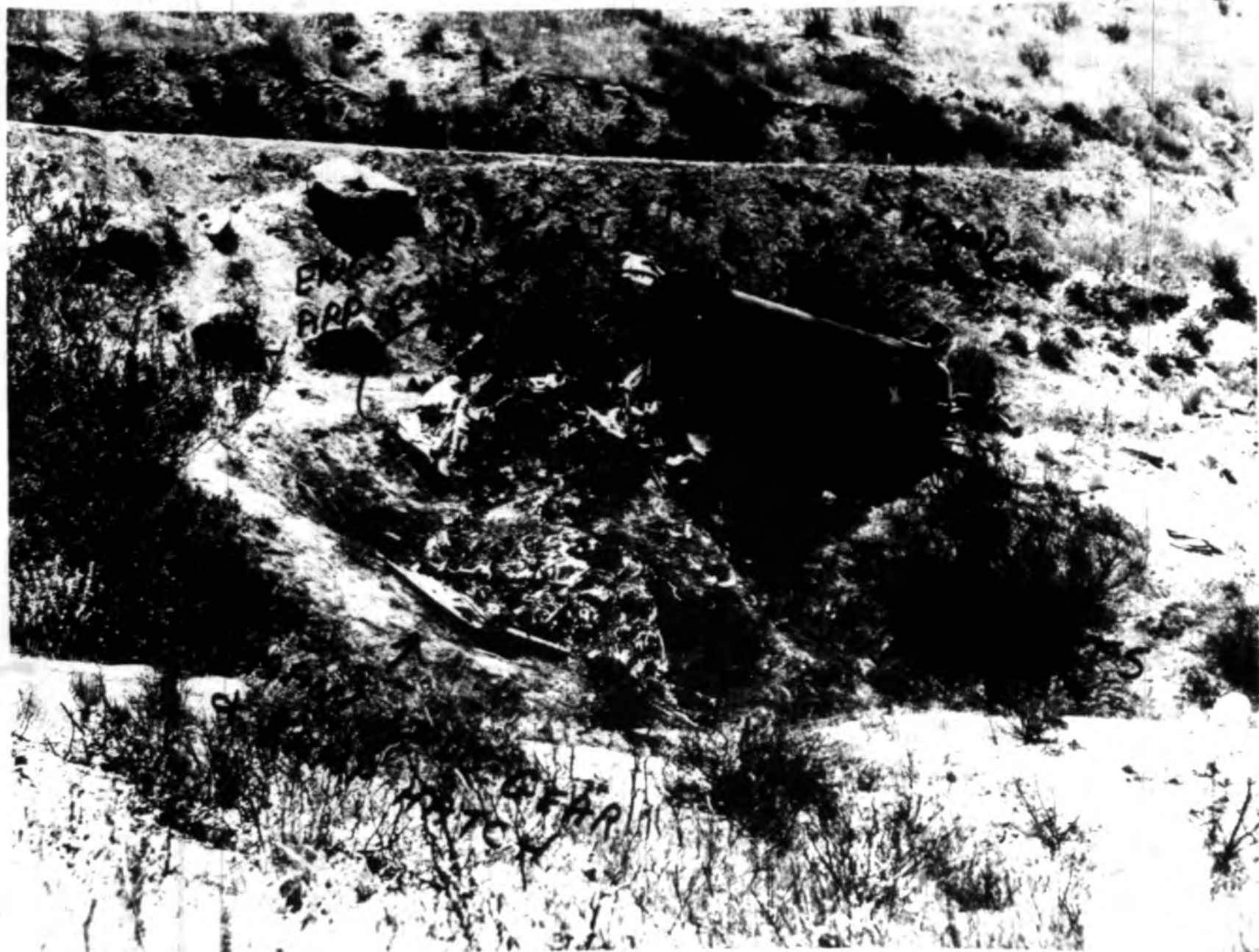
N

MAIN

MAIN
FUSELAGE
SECTION

NOT HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.2 SERIES

Excluded by 2a



THE ACCORDANCE WITH OPLAVINSE 3750.5 CH-11

HANDLING REQUIRED IN ACCORDANCE





CAUTION HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 C E

SYNC SHAFT- SECTIONS 4 & 5

Enclosure (4)

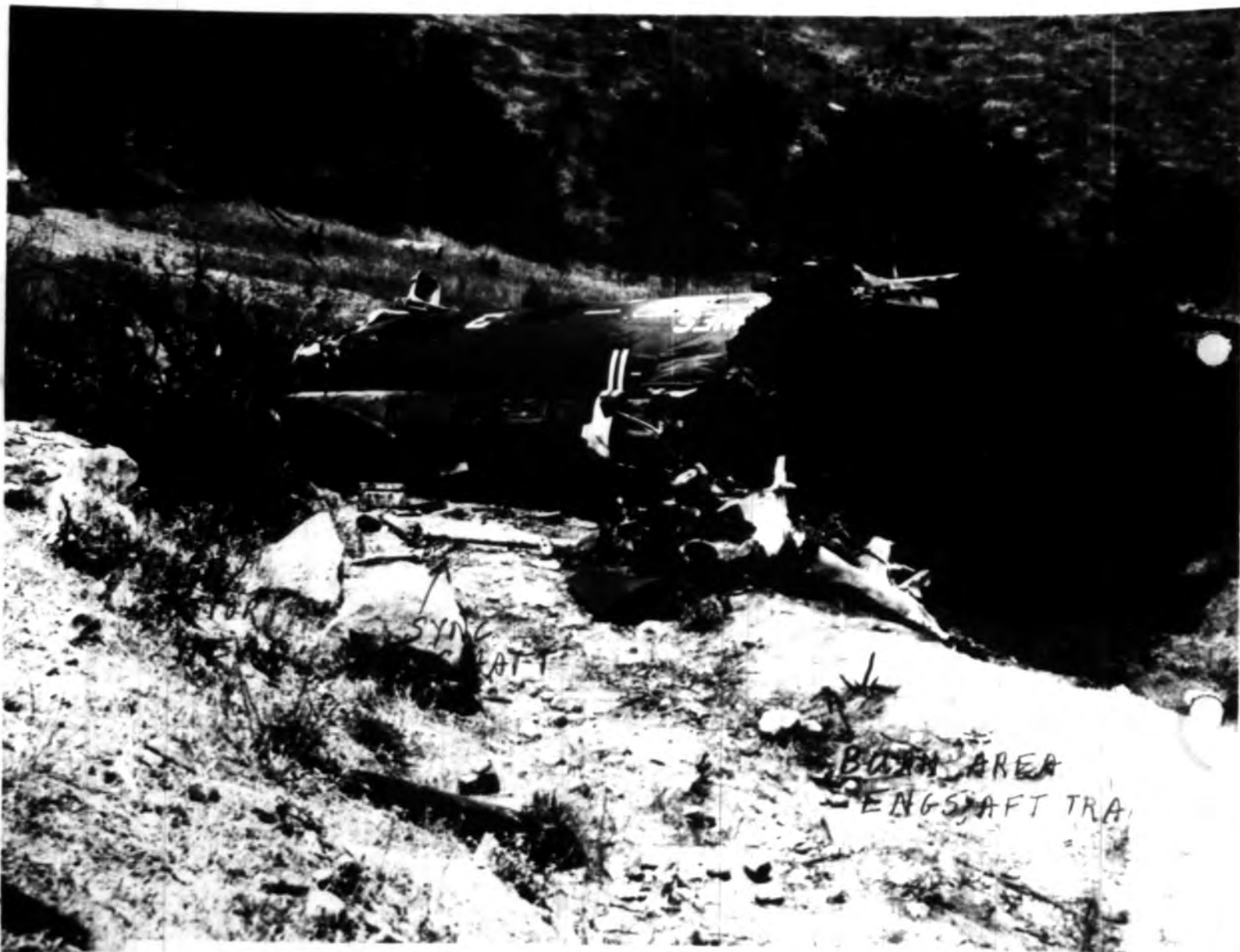


H 701 INST 3750.6

SECTION
#4

SECTION
#5

SYNCH SHAFT - SECTIONS 4 & 5



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

Enclosure 4/e

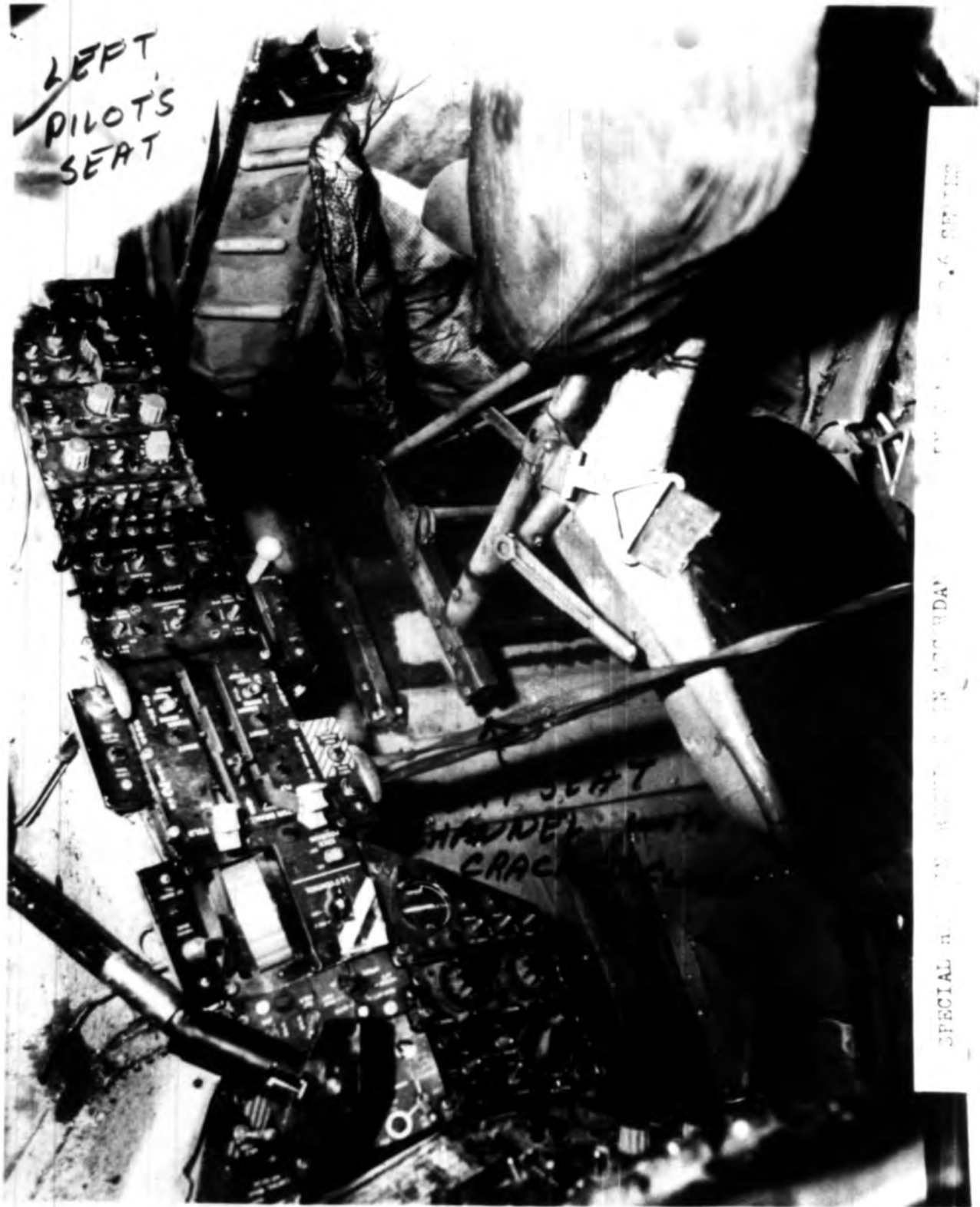


SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3710.4 SER 1213



6 SEP 6

LEFT
PILOT'S
SEAT



LEFT SEAT
CRACKED

SPECIAL REPORT ON ACCIDENT

NO. 100-100000-100000

SPECIAL INSTRUCTIONS REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

← RIGHT SEAT
DECK TRACKS →

Enclosure 4/11



SPECIAL HANDLING REQUIRED IN AIR CARGO WITH OPNAVINST 3750.6 SHIPPING



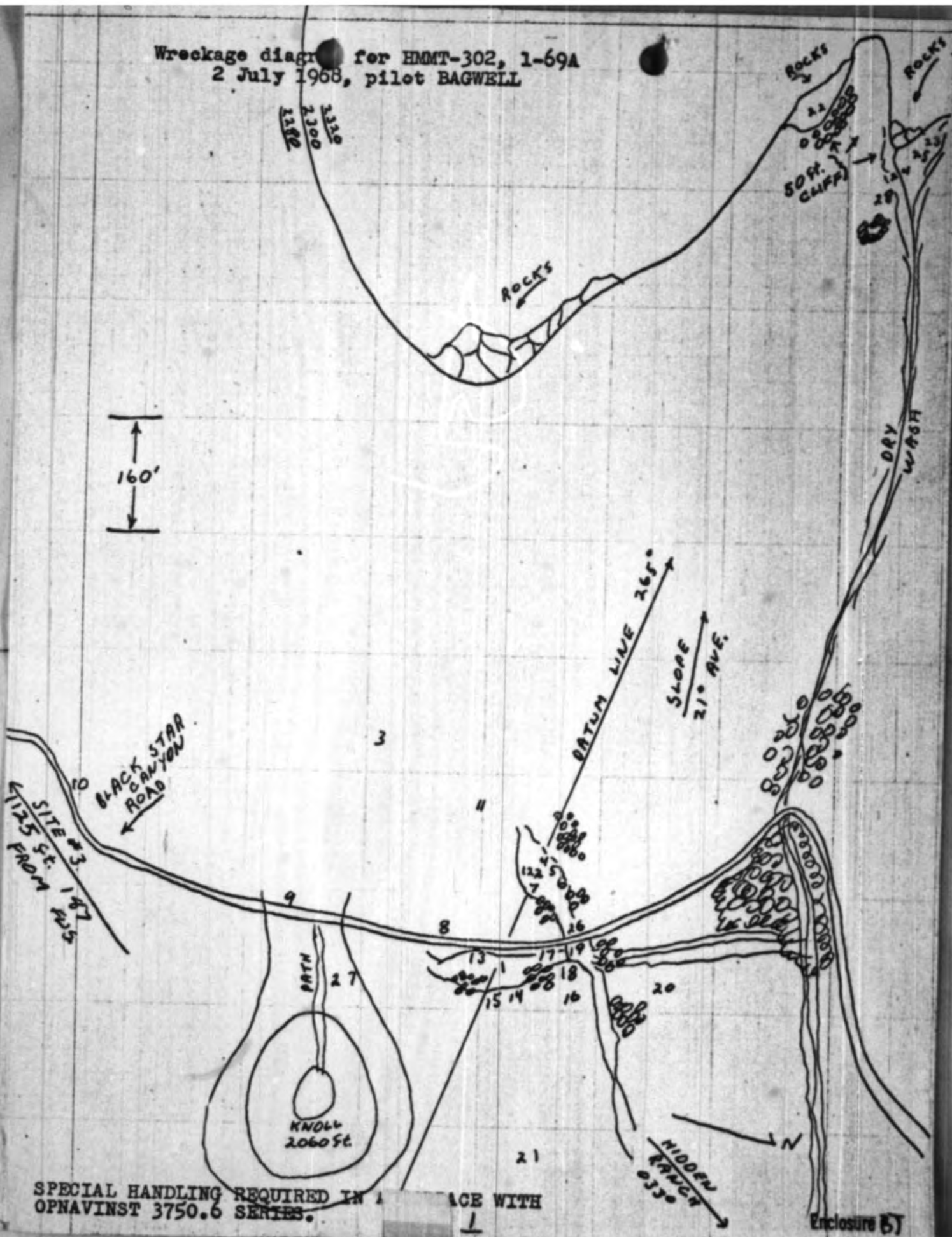
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

AFT YELLOW BLADE TIP SECTION



FATIGUE AREA
APT YELLOW 71
INBOARD
FATIGUE

Wreckage diagram for HMMT-302, 1-69A
2 July 1968, pilot BAGWELL



SPECIAL HANDLING REQUIRED IN 1 PLACE WITH
OPNAVINST 3750.6 SERIES.

Enclosure 5J

WRECKAGE DIAGRAM LEGEND

1. Main fuselage section.
2. Aft upper tail pylon section.
3. 3½ blade pockets (fwd red blade)
4. 3 pocket section of rotor blade with spar (yellow aft, one of two showing fatigue).
5. 3 pockets (aft green blade tip).
6. 1 rotor blade pocket, small piece of anti-ice blanket.
7. 12 rotor blade pockets with spar (aft yellow blade).
8. Misc. pieces of rotor blade pockets, spar, trailing edge and tip.
9. 4 foot piece of rotor blade spar.
10. 4 foot piece of rotor blade spar (fwd red blade).
11. 20 inch piece of rotor blade spar (aft red blade).
12. 4½ rotor blade pockets (aft green blade).
13. 4 rotor blade pocket (aft red blade).
14. 20 inch piece of rotor blade spar.
15. One half of the planetary gear carriage bearing.
16. 4 rotor blade pockets with spar (aft red blade tip section).
17. 6 rotor blade pockets with spar (fwd yellow blade).
18. 7 rotor blade pockets with spar.
19. Rotor blade root pocket panel.
20. 2 foot piece of rotor blade sleeve.
21. 18 inch piece of rotor blade spar.
22. 1 foot piece of rotor blade deice blanket.
23. 14 inch piece of rotor blade spar (aft yellow blade one of two showing fatigue).
24. 3 rotor blade pockets with spar (aft yellow blade tip section).
25. 1 rotor blade pocket without spar (aft yellow blade).
26. 1 rotor blade pocket without spar.
27. 1 piece of rotor blade trailing edge.
28. 1 piece of rotor blade trailing edge (aft yellow blade).

ROTOR BLADE DAMAGE DIAGRAM, HMMT-302 1-69A, 2 July 1968
Pilot BAGWELL

FORWARD BLADES



A-1-725



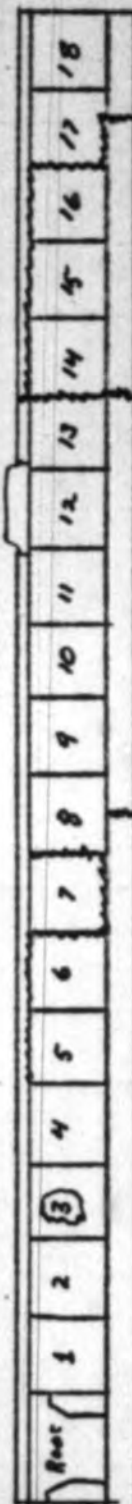
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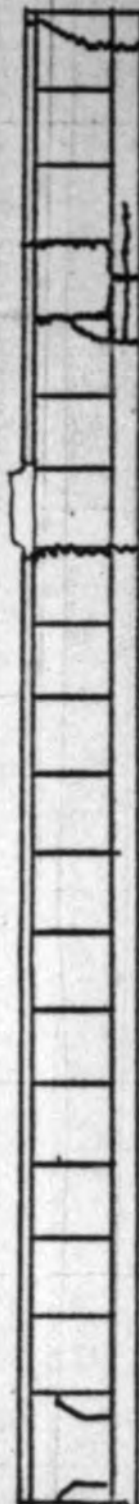
A-1-763

Denotes Missing or
Unmatchable portion

AFT BLADES



A-2-161



A-2-668



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH
OPNAVINST 3750.6 SERIES.

STATEMENT OF MR. ROGER PARSONS: EMPLOYEE OF MR. CLANTON, A WITNESS TO THE ACCIDENT, AND ONE OF THE FIRST PERSONS ON THE SCENE.

I live on the "Hidden Ranch" in Black Star Canyon owned by Mr. Glenn Clanton. On the evening of 2 July 1968 at approximately 8:25 p.m. I was watching television with Mrs. Clanton and her daughter. I am able to pinpoint this time pretty well because we were waiting for an 8:30 program which had not started yet. We heard an unusual noise emanating from a helicopter outside the house. It was unusual enough that all of us in the house got up to see what was wrong. The noise sounded like four or five bursts of a clattering noise, like putting a stick in a fan. We then heard Mr. Clanton call "One of them is going in". We ran outside, heard the impact and saw a cloud of dust and black smoke. I did not see the helicopter in flight. Mr. Clanton got into his car and rushed to the crash site, and I followed in my pickup truck about 1 or 2 minutes behind.

I arrived at the crash site at about 8:30 p.m. I stayed at the crash site and got out of my truck. The rear section of the helicopter was burning. As I started down the hill towards the helicopter, I heard an explosion from the rear of the craft, and therefore circled around the front of the cockpit area and approached it. I called into the cockpit area, "Is anyone in there?" I heard someone moaning and call "Help, get me out of here." The helicopter was laying on its left side, so I climbed up to the right hand window, and saw someone in the cockpit area, crouching facing the rear. He was out of the seat, which had pulled loose from its moorings, and was also free from his seat belt and shoulder harness. His helmet was off. I asked him if he was hurt, and he answered "My left arm hurts". I then assisted him out of the cockpit and started up the hill, supporting him. He was unable to make it up the crest of the hill so I said "lets rest awhile". The injured man said "No, no we have to get away, we're not far enough away." We then moved down the draw away from the crash site. We then proceeded up to the road where Mrs. Clanton was waiting with her car. I assisted him into the car and asked if there were any more aboard; he answered "Two": I then took a fire extinguisher from my pickup as the brush was burning and proceeded back down to the crash site. I climbed back up and looked into the cockpit. I saw two helmets, one was lying free in the cockpit, and the other was still on a second man. I then removed the seat which was lying on top of the body and placed it on the side of the helicopter. I went into the cockpit and determined that the second man was dead. He was strapped into this seat with his helmet on. He was lying on his left side and appeared to be impinged between the seat and the side of the helicopter, and the back of the seat was crumpled. I then climbed out of the cockpit and expended my fire extinguisher on the brush fire. I then climbed into the rear section and saw a second body. I went up to the body and determined that he also was dead.

(b) (6)

Special Handling required in
accordance with OIAVINST 3750.6
Series

Certified & True Copy

Enclosure (6)

The body was lying on the right side with the head to the rear. His helmet was on but he had no seat belt or restraining belt of any kind. The back of the rear compartment was burning. I found a fire extinguisher and sprayed the fire, but was unable to put out the fire. I then sprayed the body of the crew chief to keep it from burning. I then climbed out of the helicopter and expended the fire extinguisher on the brush fire.

The Silverado volunteer fire department then arrived and removed the bodies. I then stood aside and let the authorities take over.

/s/ Mr. ROGER PARSONS

Mr. Roger PARSONS is considered to be a credible witness although he has had no aeronautical experience.

Special Handling required in accordance
with OPNAVNET 3750.6 Series

Certified A True Copy

(b) (6)

**STATEMENT OF MRS. GLENN CLANTON: WIFE OF MR. GLENN CLANTON AND
A WITNESS TO THE ACCIDENT.**

I live with my husband and daughter at P.O. Box #91, Silverado, Calif. (Hidden Ranch). On Tuesday night, July 2, 1968, my daughter, Roger Parsons and I were watching television. My husband was in the front yard working on the lawn. We are quite accustomed to hearing helicopters as our home is fairly close to a landing area that the helicopters from the Marine base use for practice. At slightly before 8:30, we heard a helicopter making an unusual noise outside. As we stood up to go outside to investigate, Glenn called out, "One of them is going down." We all ran outside and could see the area where the helicopter crashed, although we couldn't see the helicopter from the front yard. Glenn got into his car and drove towards the crash, and Roger followed in his truck. About three or four minutes later we (my daughter and I) heard an explosion from the crash area and fearing that Roger and Glenn might have been hurt, drove to the crash site. By the time we got there, Roger was helping the survivor to the road. He had some pretty bad cuts on his face and was somewhat incoherent. We put him in our car and started down the hill hoping to meet an ambulance on the way. As we proceeded down the hill, we passed numerous emergency vehicles, but they were in such a hurry to get to the crash that they wouldn't stop for us, so we continued towards Santa Ana and a hospital. The injured man mumbled over and over a desire to get to a hospital. Enroute to the hospital we were able to flag down a policeman who provided us with an escort to St. Joseph's Hospital in Santa Ana,

/s/ MRS. GLENN CLANTON

Mrs. Glenn CLANTON is considered to be a credible witness although she has had no aeronautical experience.

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with OMAVINST 3750.6 Series

Certified A True Copy

(b) (6)

Enclosure (a) 7

STATEMENT OF MR. GLENN CLANTON: OWNER OF A RANCH LOCATED APPROXIMATELY ONE-HALF MILE FROM THE CRASH SITE. A WITNESS TO THE ACCIDENT.

I live on "Hidden Ranch", which is located in Black Star Canyon, Orange County, California (map location AMS Series V895, 1 SW, coordinates 397406). The post office address is P.O. Box #91, Silverado, California. My ranch is located near a helicopter landing site (coordinates 392398) used by Marine Corps helicopters which I understand is known as Site #3. I observe Marine helicopters making numerous landings at Site #3 almost every day since I live near the site, and their landing approach pattern often brings them fairly close to my house.

On the evening of 2 July 1968, at approximately 8:25 p.m., I was in my front yard tending the flowers that surround the front of my house. While watering the flowers, I observed a large Marine helicopter with two main rotors in tandem making landings at Site #3. The helicopter made two or three left hand approaches to the site, then apparently was going to make an approach from the other direction (right hand approach). I observed him in a wide looping approach which took him over a ravine, everything appeared to be normal; the aircraft appeared to be in a normal attitude, and there were no unusual noises emanating from the aircraft. As the approach continued, and as they approached the landing zone, the rate of descent was increased, and all noise from the aircraft ceased. The helicopter descended out of my line of sight, and I called into the house to my wife and daughter and Mr. PARSONS, "One of them is going in". I heard the impact of the helicopter hitting the ground, although there was no explosion upon impact. I also saw a cloud of dust rise from the area and also a cloud of black smoke. I did not see the actual impact. I jumped into my car and drove the approximate half-mile to the crash site. The helicopter had crashed only about ten feet from the road and I stopped and thought that everyone aboard must be dead and noticed the fires starting, so I drove straight to the Silverado Fire Department to notify them. I told them to contact the Marine Base before they left for the crash scene, which I don't think they did. I then returned to the crash site myself, and met my wife and daughter driving down the hill towards the hospital with the injured co-pilot. They continued on to the hospital, and I returned to the crash scene.

/s/ GLENN CLANTON

Mr. Glenn CLANTON is considered to be a credible witness although he has had no aeronautical experience.

Special Handling required in accordance with O-NAVINST 3750.6 Series

(b) (6)

RESCUE REPORT

OPNAV FORM 3750-13 (3-63)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6E
INSTRUCTIONS: SEE REVERSE

OPNAV REPORT SYMBOL 3750.14

1. FROM COMMANDING GENERAL		2. DATE OF MISAP	2A. DATE OF RESCUE
U. S. MARINE CORPS AIR STATION, EL TORO (SANTA ANA) CAL.		2 July 1968	2 July 1968
3. LOCATION AND DUTIES OF RESCUE VEHICLE		4. RESCUE VEHICLE (Type/model)	
SAR MCAS EL TORO		UH34D	
5. NUMBER OF PERSONNEL	5A. IN RESCUE VEHICLE OR ON RESCUE TEAM	5B. TO BE RESCUED	5C. RESCUED
3			
7. TIME SEQUENCE OF EVENTS (Local Date Time Group)		8. WEATHER CONDITIONS AT RESCUE SITE	
7A. Alert Received Method		8A. WATER TEMPERATURE	AIR TEMPERATURE
2105T RADIO CALL FROM TOWER		°F	71 °F
7B. Vehicle Departed Distance to Scene		WIND VELOCITY	
2105T 8.5nm		030/04	
7C. Arrived on Scene Search Required		8B. SEA STATE/WAVE HEIGHT/FREQUENCY; TERRAIN DESCRIPTION	
2111T NONE		2000 Feet Rough Terrain Canyon Draw	
7D. Located Survivor Method of Locating		9. EQUIPMENTS ACTUALLY USED DURING RESCUE	
7E. Began Retrieval What Was Sighted First		UH34D Litterbasket	
7F. Ended Retrieval Subsequently			
7G. Survivor(s) Disembarked Location (If different from Item 3)			

10. DIFFICULTIES ENCOUNTERED (List all difficulties and effect on final outcome of rescue attempt, i.e., ALERTING PERIOD, SEARCH/LOCATING, RETRIEVING, POST-RETRIEVAL)

11. PERSONNEL REQUIRING RESCUE	GIVE REASON FOR RESCUE	FACTORS COMPLICATING RESCUE ATTEMPT
NAME-LAST FIRST INITIAL		Physical condition, ignorance of equipment, sea state, etc.

12. REMARKS: (Training of rescue team or crew, communication equipments/technique, retrieval equipments/techniques, rescue vehicle)
Received call from Tower at 2105T. Proceeded to Black Star Canyon. Arrived to find CH46 broken in half with aft section on fire. Surviving crew member was already enroute to hospital via ground vehicle. Two divisions of Forestry vehicles were already at the crash site. Returned to MCAS El Toro and picked up the Flight Surgeon on duty. Returned to crash site. Aided in retrieval of the two fatalities and flew them to MCAS El Toro hospital. Also coordinated with MCAP Santa Ana in arranging for an ambulance. A CH46 (SQ07) arrived with the ambulance unit 150, and a communicator. Another CH46 (SQ17) arrived at approximately 2235T with security personnel and acted as radio relay. The fire was finally extinguished at approximately 2310T. Returned to MCAS El Toro.

13. ATTACH ENCLOSURES: Narratives of search, location and retrieving—Survivor's statements	
14. NAME AND TITLE OF SUBMITTING OFFICIAL	SIGNATURE OF SUBMITTING OFFICIAL
(b) (6) CAPT OicSAR	(b) (6)
15. NAME AND TITLE OF FORWARDING OFFICIAL	SIGNATURE OF FORWARDING OFFICIAL
(b) (6) LtCol. USMC AFldOnsC	(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

By direction

Q&A

OPNAV FORM 3760-2 (REV. 2-65)
5/N 0107-734-2001

2 JULY, 68

Retain at place of TAKE-OFF.

A/C MODEL	SU. NO.	A/C TIRE NO.	A/C REPORTING CUSTOMER
CH-46D	153343	Sq-3	HMMT - 302
FLIGHT CODE	DESTINATION/PLANNED STOPS ENROUTE		

FUEL (Gals. or lbs.)		LUBE OIL (Gals.)				ORDNANCE, PYROTECHNICS ON BOARD (Kind and quantity)	
GRADE	QUANTITY	GRADE	1	2	3		4
JP-5	1200/1200	23699	3/4	3/4			NONE

A/C LIMITATIONS:

PMs ↓

Fm ↓

CERTIFICATION: I certify that this A/C has been inspected this day in accordance with approved preflight INSTRUCTIONS, is serviced as stated above, and is ready for flight.

(b) (6)

BATH

ACCEPTANCE: I accept this A/C for flight. I have examined the last 21 Discrepancy Reports on this A/C. I certify that all requirements for weight and balance clearance, DD-365F, on this A/C have been fulfilled.

(b) (6)

EJN

NOTE: List Personnel on board on the reverse of PART A if no other list is filed.

A/C MODEL CH-46A	SU. NO. 153343	A/C TIME THIS FLIGHT	DATE	A/C CONDITION IS: (Circle UP or DOWN)	<input type="radio"/> UP <input checked="" type="radio"/> DOWN
---------------------	-------------------	----------------------	------	--	--

B—MAINTENANCE (Mark GROUNDING discrepancies with an "X.")[illegible]

<input type="checkbox"/> CONTINUED ON REVERSE OF THIS PART	PILOT'S SIGNATURE	UNIT
--	-------------------	------

[illegible]

☐ CONTINUED ON REVERSE OF THIS PART
 INSPECTOR'S SIGNATURE
(b) (6)

(b) (6)

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

Enck

Marine Corps Air Facility
Santa Ana, California, 92709

DATE OF INCIDENT

3 July 1968

AFRAN NO.

1-68

DATE AND TIME OF INCIDENT

2 July 1968 2114 PDST

ON STATION

OFF STATION

2

REPORTING CUSTODIAN

MODEL AIRCRAFT INVOLVED

BUREAU NO.

FMNT-302, MWTG-30, MCAF, Santa Ana, Calif

CH-46D

153343

Commander, Naval Air Systems Command (AIR-4232)

TO: ~~Commander, Naval Air Systems Command (AIR-4232)~~

EXACT LOCATION OF INCIDENT

350°/8½ NM El Toro TACA

VIA MILITARY COMMAND
Commanding General, Marine Corps Air Bases, Western
Area, MCAS, El Toro, Santa Ana, California, 92709

TYPE OF INCIDENT			FIRE INVOLVED	ESTIMATED CASE
TAKE-OFF	LINE OR LOADING	FUELING	YES	2
LANDING	PARKED	MAINTENANCE	NO	
TAXIING	DEFUELING	INFLIGHT	2	
OTHER (Specify)			IMPACT IGNITION (Suspected)	UNKNOWN
			DELAYED IGNITION	

CONDITIONS AT TIME OF INCIDENT

GENERAL WEATHER PICTURE
Clear, Ceiling Unlimited

Visibility 10 Statute Miles

WIND DIRECTION 220°
WIND VELOCITY (mph) 04 Kts
TEMPERATURE (°F) 65.0

NATURE OF TERRAIN AT AND IN APPROACH TO INCIDENT

Rugged Mountain Terrain

LIQUID FUEL QUANTITY

ESTIMATED ON BOARD BEFORE INCIDENT (lbs) UNKNOWN
ESTIMATED ON BOARD AFTER INCIDENT (lbs) 2,100
ESTIMATED SPILL AREA (Size in feet) 110 Square Feet

OTHER FUELS

N/A

PERSONNEL RESCUE

NO. PERSONNEL ON BOARD AIRCRAFT 3
NO. PERSONNEL SURVIVED 1
NO. PERSONNEL ESCAPED UNAIDED 0
NO. PERSONNEL RESCUED 1

DESCRIBE RESCUE METHODS USED

UNKNOWN. One injured aircrewman was rescued from the aircraft and transported approximately 20 miles to a civilian hospital by a local civilian.

FIRE FIGHTING

FIRST METHOD OF ALARM USED

TIME RECORD

TWO-WAY RADIO

EMERGENCY INTER-COM.

EMERGENCY PHONE

TIME ALARM RECEIVED 2117 PDST

OTHER METHOD (State)

TIME EQUIPMENT ARRIVED 2130 PDST

STATION EQUIPMENT

EACH EQUIPMENT AVAILABLE AT INCIDENT		NO. PERSONNEL MANNING EQUIPMENT		QUANTITY EXTINGUISHING AGENTS USED	
TYPE	NO. LOADS USED	MIL.	CIV.	FOAM (gals. conc. used)	OTHER TYPES AND QUANTITIES
ANGUL UNIT	0 (VIA AIR)	3			
MB-5	0	4			1 TMB Ext
MB-5	0	4			3 TMB Ext
Pick-Up		2			
5 PUMPER & 1 RESCUE VEHICLES				29 (FORESTRY DIV PER & EQUIP)	300 Gals Water

STATION EQUIPMENT OUT OF SERVICE

TYPE	DEFICIENCY	NO. OF DAYS	EXPLAIN DELAYS TO REPAIR
TANKER	Transmission	1½	N/A
Pick-Up	Re-Painted	5	N/A

CERTIFIED TRUE

(b) (6)

EXHAUSTION DUE TO UNUSUAL CONDITIONS OR EQUIPMENT
AND/OR AGENT INADEQUACIES

N/A

RECOMMENDATIONS FOR IMPROVEMENTS IN EQUIPMENT
AND/OR PROCEDURES TO INCREASE EFFICIENCY

1. That all crash officers vehicles have UHF radios installed immediately to handle rescue aircraft and support aircraft at the crash scene.
2. That more attention be giving to local fire fighting agencies in accordance with SecNavinst 11320.5 (Mutual Aid Agreement) to better facilitate rescue of personnel in down aircraft off station such as frequent aircraft check out and fire-rescue technique along with

MONETARY LOSSES (Estimated)		
PERCENT DAMAGE BY IMPACT	PERCENT DAMAGE BY FIRE	LOSS TO SURROUNDING PROPERTY
Strike	60%	N/A
DATE	PREPARED BY (Name and title)	SIGNATURE
5 July 1968	(b) (6) Asst Ops Officer	
DATE	STATUS OF RECOMMENDATIONS	SIGNATURE
7 July 1968	K. E. HUNTINGTON	(b) (6)

CERTIFIED TRUE COPY

1. All Crash & Fire Fighting equipment parked parallel to crashed aircraft on roadway. See overall view of crash area, Enclosure (3).

CERTIFIED TRUE COPY

(b) (6)

See Enclosure (1)

FULL DESCRIPTION OF FIREFIGHTING OR PROTECTION AT INCIDENT, MCAF AFRR 1-68

1. Upon notification, three (3) Crash rescuemen and an ANSUL Airlift Unit were immediately airlifted to the scene of the crash. The first A/C carried the ANSUL Unit and the second carried the Crash rescuemen.
2. Two (2) MB-5 Crash Trucks (one MB-5 from MCAS, El Toro) and one MCAF Crash Pick-Up truck departed immediately by a surface route.
3. The crashed aircraft carried a crew of three men, none of which were removed by military crash rescuemen. Upon arrival of the MCAF airborne crash rescuemen, all aircrewmen had been removed from the crashed aircraft. An immediate search of the crash scene area was made for possible additional aircrewmen.
4. One aircrewman had been removed and transported, by personal conveyance, to a civilian hospital about 20 miles away by a Mr. TARSONS of the Hidden Ranch nearby. Mr. TARSONS left before anyone else arrived at the scene. His rescue methods are unknown at this time.
5. The other two aircrewman had been removed by California State Division of Forestry personnel, who were the first fire fighting personnel and equipment on the scene, and taken to MCAS, El Toro on the SAR Helicopter. With the aircraft lying on its left side, their rescue methods were:
 - a. Cut out the center and right front cockpit windows and frame with portable hand rescue saw and cut the frame electrical wiring with bolt cutters. Enclosure (2). This enabled them to remove one aircrewman from the left front seat after unstrapping him. This crewman was placed on a stretcher and carried up a 30 foot slope to be evacuated from the scene. See roadway distance from crashed aircraft, enclosure (3).
 - b. The remaining aircrewman was located just below the right side door against the left side of the fuselage and evacuated in the same manner as the second aircrewman.
6. A magnesium fire was only aircraft fire still burning (aft section of the aircraft) out of control at this time. An effort was made by crash-rescue personnel to suppress this fire using shovels from the forestry vehicles to throw dirt on the fire. This effort proved unsuccessful due to the magnitude of the magnesium fire. See enclosure (4). A small brush fire started by the crash was quickly extinguished by Forestry personnel.

(ENCLOSURE (1))

7. Total extinguishment was achieved within 20 minutes after the arrival of surface crash equipment. Only three (3) TMB hand extinguishers and 300 gallons of water was used to extinguished this magnesium fire. See enclosure (5).
8. The Ice Detector Probe Capsule, P/N 1278-1841M, was not immediately located at the crash site and was presumed destroyed by fire. One sealed ignition unit junction box, P/N 10-187900-3, 3-5 microcuries, "Cesium Barium 137" was found. See enclosure (6). The other ignition unit was destroyed in the fire. An immediate radiological survey conducted by MCAF Crash personnel, at the scene using an AM/POR-27 Radiac Instrument (carried on all MCAF Crash Trucks) indicated a normal reading for the area.
9. During subsequent salvage operations, at 1100 on 5 July 1968, the Ice Detector Probe was located and found to be leaking (about 200 yards from the crash scene higher up on the hill). See enclosures (7) and (8). Readings were as follows:
- a. $11\frac{1}{2}$ MR/HR @ 3 - 5 CM
 - b. 5 -7 MR/HR @ 1M
- Note: Normal reading is 3 -5 MR/HR @ 1 - 3 CM or, 2 MR/HR on the surface.
10. This leakage was enough to present a health hazard should personal contact have been made with the unit. No one, upon questioning by the MCAF NCOIC of the NBC Branch, had been close or touched the unit. A radiological monitoring of personnel in the vicinity indicated normal.
11. The Ice Detector Probe was turned over to the NCOIC of the MCAF NBC Branch for handling and disposition in accordance with NAVAIR 01-1A-509.
12. One MCAF Crash Truck with four men remained at the crash scene throughout the night.

(ENCLOSURE (1))



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OASD 3750.6 SERIES



Enclosure (3)

Enclosure (4)



SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

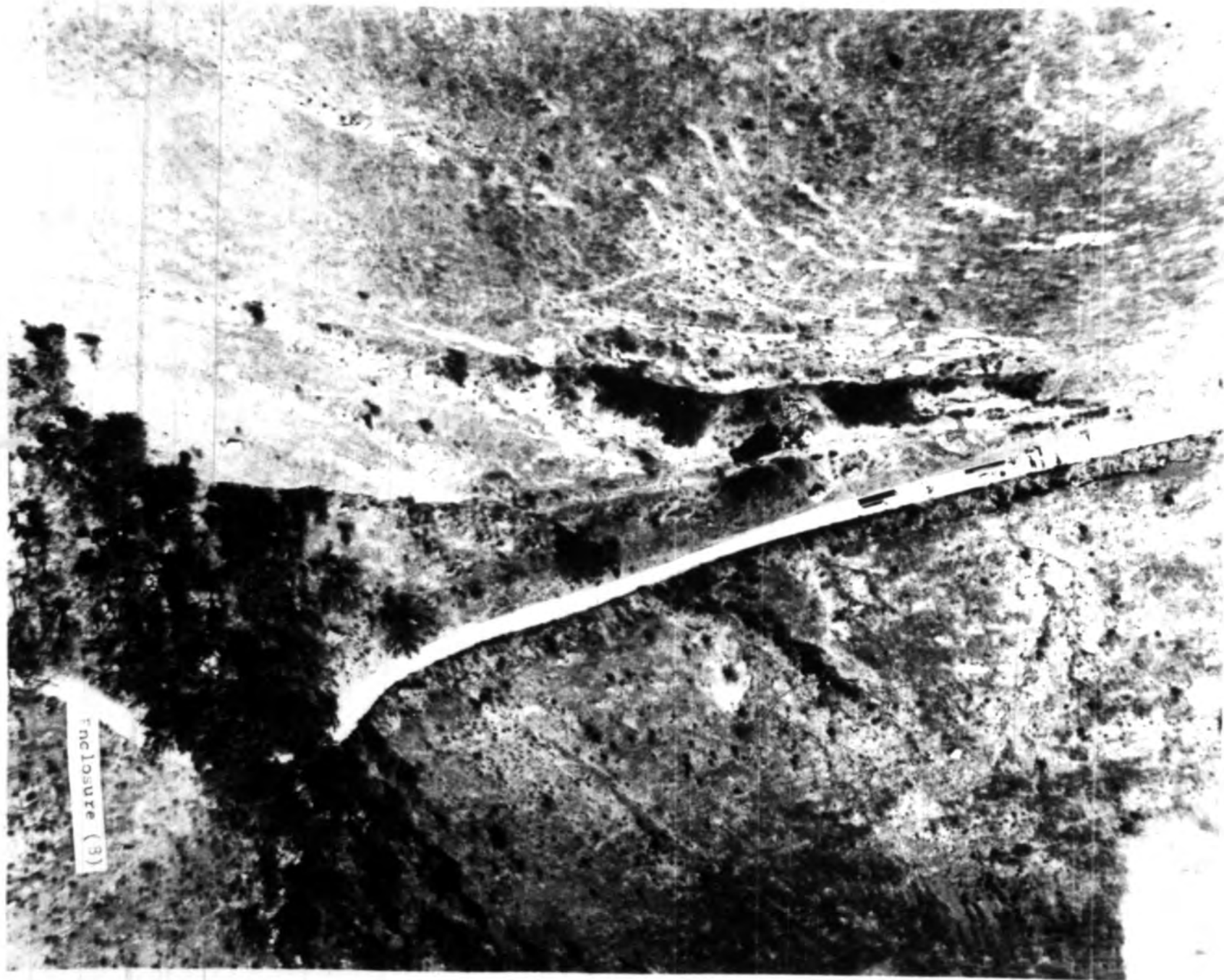
Enclosure (5)

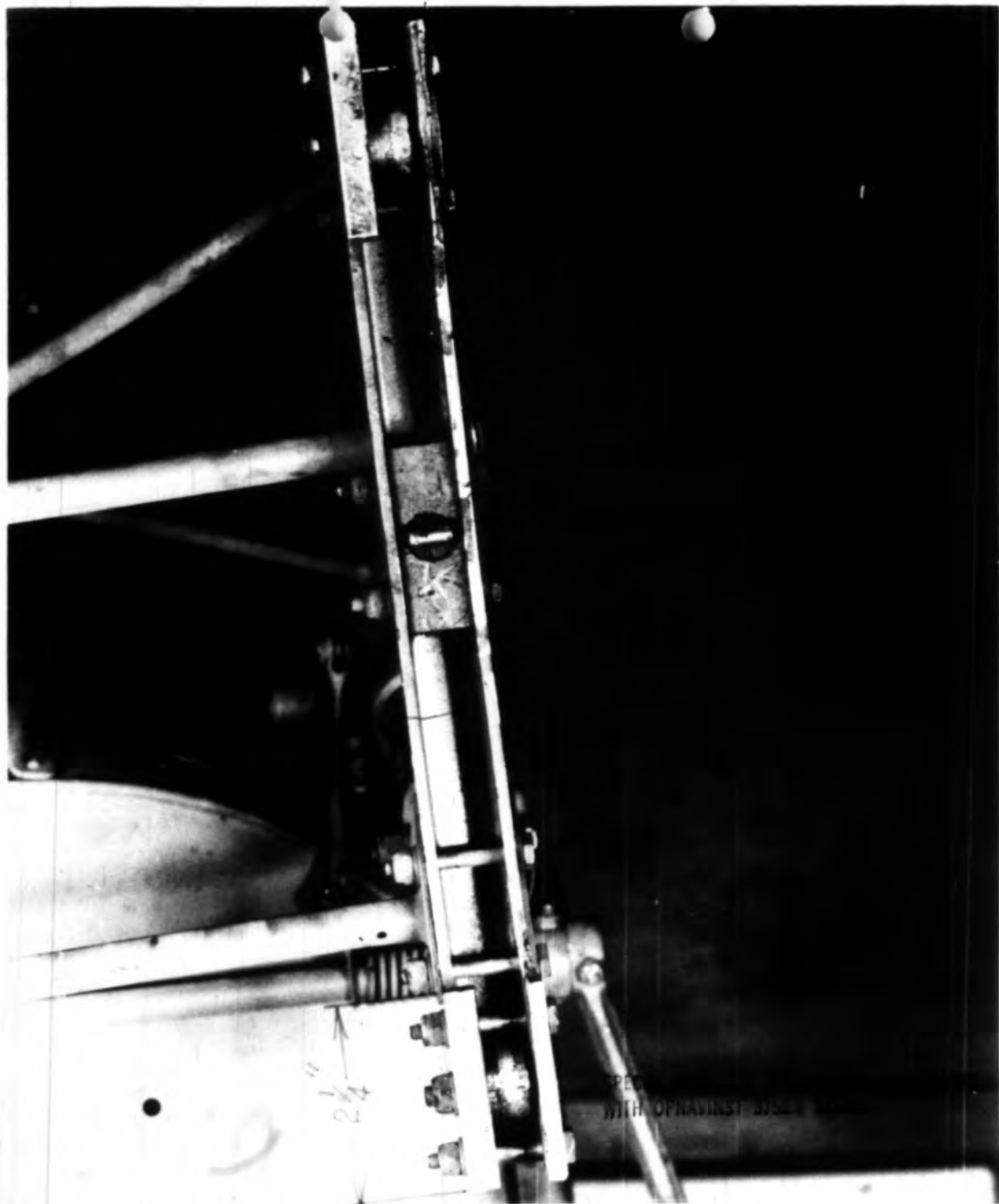
SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH OPNAVINST 3750.6 SERIES

SPECIAL HANDLING REQUIRED IN ACCORDANCE WITH 3750.6 SERIES

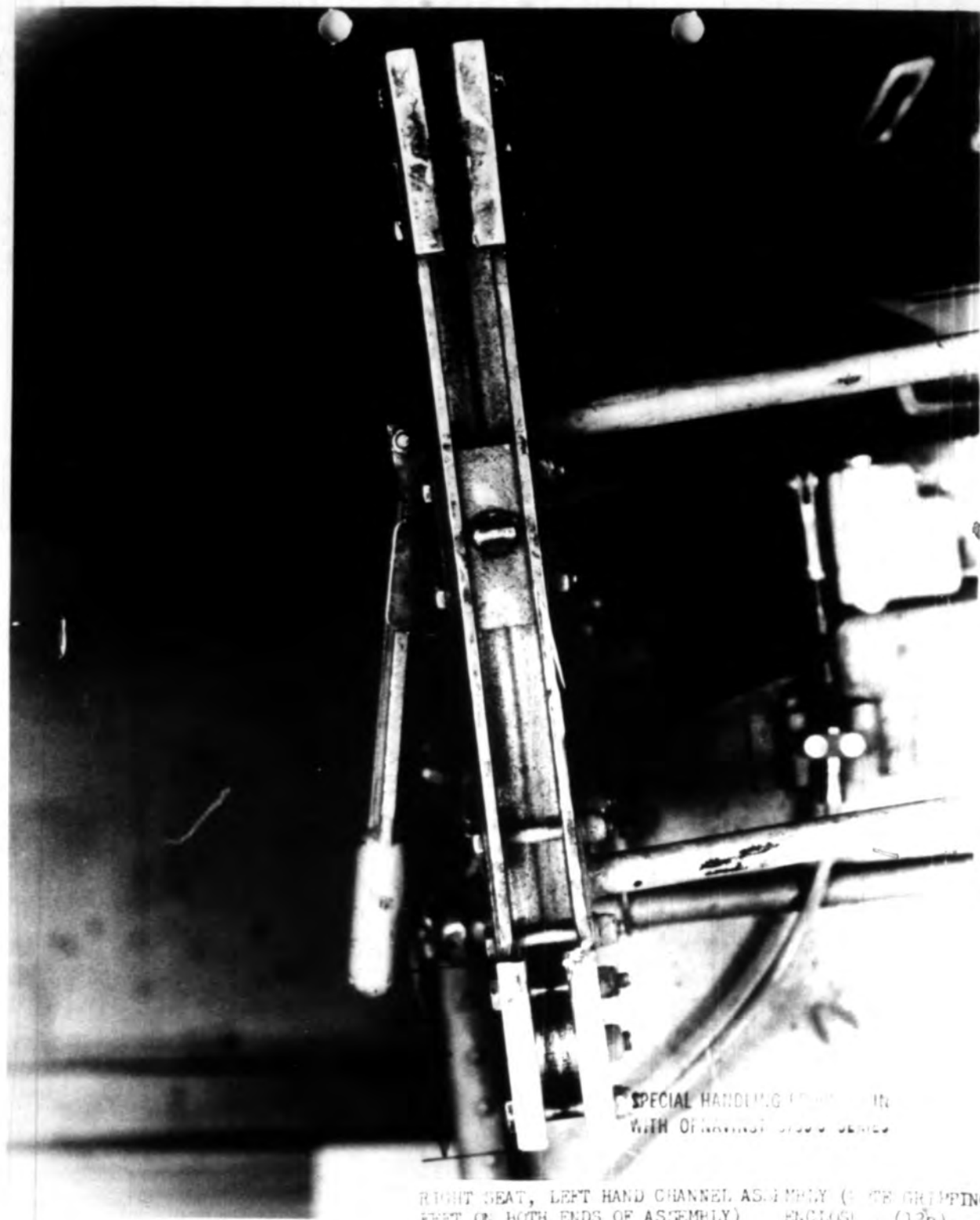









RIGHT SEAT, RIGHT HAND CHANNEL ASSEMBLY (NOTE GRIPPING
FEET ON BOTH ENDS OF ASSEMBLY) ENCLOSURE (12a)



SPECIAL HANDLING EQUIPMENT
WITH OPERATING 57000 SERIES

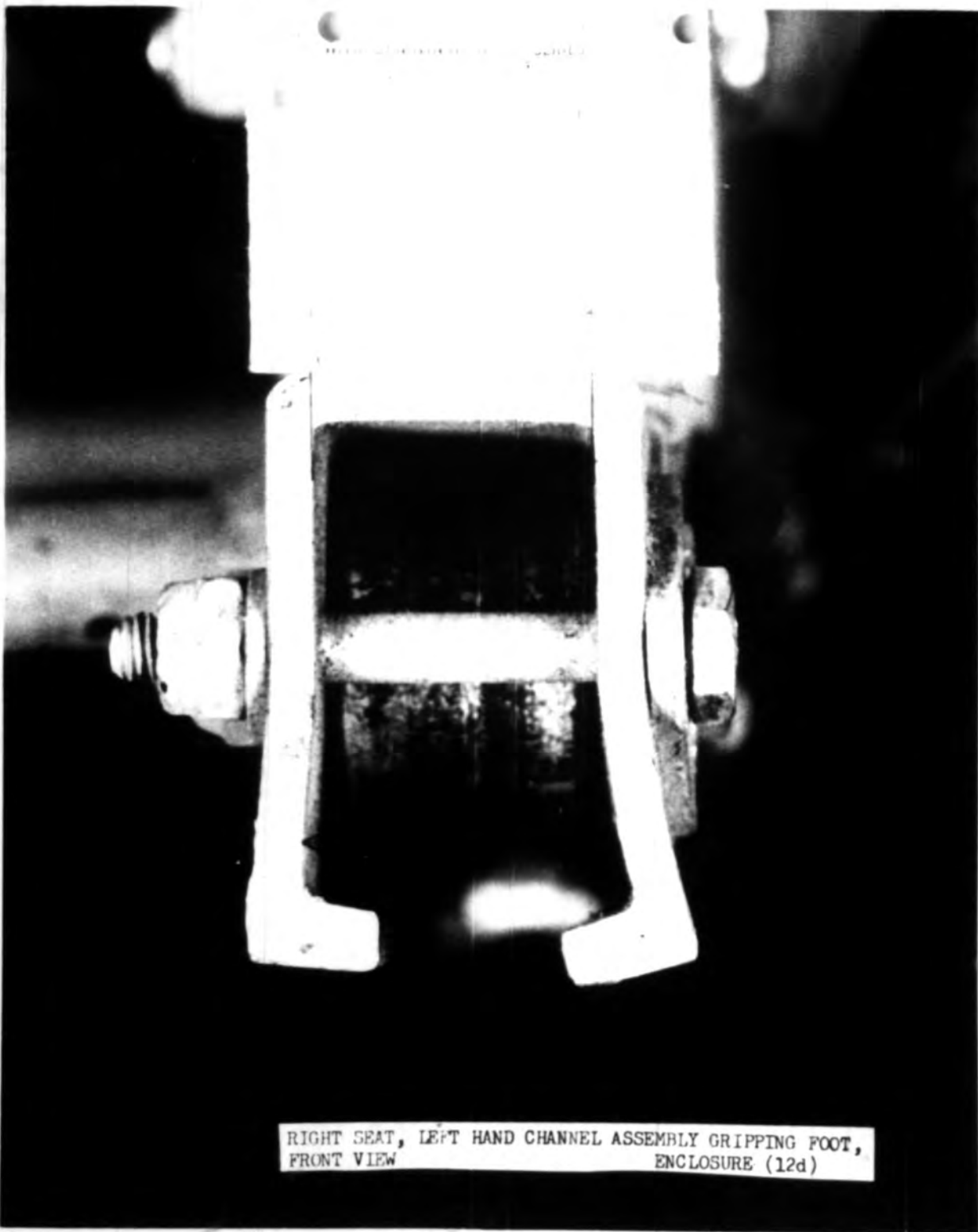
RIGHT SEAT, LEFT HAND CHANNEL ASSEMBLY (SEE GRIPPING
FEET ON BOTH ENDS OF ASSEMBLY) ENCLOSURE (12b)



SPECIA. IN P.M. 1955
 1000 C. 1000 C. 1000 C.

RIGHT SEAT, RIGHT HAND CHANNEL ASSEMBLY GRIPPING FOOT,
 REAR VIEW ENCLOSURE (12c)

RIGHT SEAT, RIGHT HAND CHANNEL ASSEMBLY GRIPPING FOOT,
REAR VIEW ENCLOSURE (12c)



RIGHT SEAT, LEFT HAND CHANNEL ASSEMBLY GRIPPING FOOT,
FRONT VIEW

ENCLOSURE (12d)

RIGHT SEAT, TRACK INSTALLATIONS ENCLOSURE (12e)

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES



↓
FWD

SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH ORNAVINST 3750.6 SERIES

RIGHT SEAT, TRACK INSTALLATIONS, INSTALLED ENCLOSURE (12f)



SPECIAL HANDLING REQUIRED IN ACCORDANCE
WITH OPNAVINST 3750.6 SERIES

LEFT SEAT, TRACK INSTALLATIONS, INSTALLED ENCLOSURE (12g)

ACTION COPY

(Check one)

RTTEZYUW RUHHFMA0713 240031-EEEE--RUEBBHB RUEBHOA RUWJMUA

RUMHAW RUWJBRA RUCILS reference, retain

ZNY EEEEE

destroy

R 040031Z AUG 68

Signature

FM CG FMFPAC

4AUG68 0452Z

TO RUEBBHB/NAVAIRSYS COMHQ

DRAFTED: G-4AT

INFO RUEBHOA/CMC

CONCURRED: FSSO, G-3,

RUWJMUA/COMNAVAIRPAC

RELEASED: G-4

RUMHAW/CG FIRST MAW (P004)

RUWJBRA/CG THIRD MAW

RUCILSA/NAVAIRSAFCEN NORVA

BT

UNCLAS E F T O

CH-46 ROTOR BLADE RELIABILITY AND INSP

A. CG 3DMAW 171653Z/JUL68 (PASEP)

1. REF A IS AN ANALYSIS OF THE INADEQUACIES ASSOCIATED WITH THE CH-46 ROTOR BLADES, PRESENT FIELD TESTING EQUIPMENT AND PERIODIC INSPECTION REQUIREMENT.
2. THIS HQ CONCURS WITH THE ANALYSIS CONTAINED REF A AND IS CONCERNED WITH THE OVERALL CH-46 ROTOR BLADE SITUATION.
3. TWO CH-46 ACFT ACCIDENTS HAVE RESULTED FROM ROTOR BLADE FAILURES APPARENTLY INVOLVING A MANUFACTURING DEFECT IN THE BLADE. IN BOTH INCIDENTS THE ROTOR BLADES INVOLVED WERE NON-ULTRASONICALLY

PAGE 2 RUHHFMA0713 UNCLAS E F T O

TESTED (UT) BLADES WITH 100 HOURS OR LESS OPERATING TIME. DUE TO THE NOMINAL NUMBER OF ROTOR BLADES IN THIS CATEGORY, THE TEMPORARY REMOVAL OF ALL NON-UT ROTOR BLADES WITH 100 HRS OR LESS OPERATING TIME APPEARS FEASIBLE. EDDY CURRENT AND OR X-RAY TESTING OF ALL CH-46 BLADES WOULD BE AN INTRICATE, TIME CONSUMING PROCEDURE CAUSING EXCESSIVE LOSS OF OPERATIONAL READINESS AND HIGH EXPENDITURE OF MAINTENANCE MANHOURS. FURTHERMORE, WITH THE KNOWN INABILITY OF THE PRESENT EDDY CURRENT TESTER TO DIFFERENTIATE BETWEEN VALID DEFECTS AND KNOWN IRREGULARITIES IN THE BLADE ZINC PLATING, A HIGH REJECTION RATE OF BLADES WHICH ARE ACTUALLY AERONAUTICALLY SOUND CAN BE ANTICIPATED. ALTHOUGH A PERIODIC FIELD INSPECTION OF ALL CH-46 ROTOR BLADES TO ASSURE BLADE INTEGRITY AGAINST FAILURE FROM CAUSES OTHER THAN MANUFACTURING DEFECT IS CONCURRED IN, UTILIZING THE PRESENT EDDY CURRENT TESTER OR X-RAY FOR THIS PURPOSE IS DEEMED AN UNACCEPTABLE METHOD. THEREFORE, EDDY CURRENT TESTING OF ALL BLADES SHOULD NOT BE CONSIDERED AS THE ULTIMATE METHOD FOR FIELD TESTING OF CH-46 ROTOR BLADES IF DEVELOPMENT OF THE IMPROVED ELECTRONIC MAGNETIC FIELD TEST UNIT PROVES UNSATISFACTORY.

SPECIAL INSTRUCTIONS REQUIRED IN

R 040031Z/AUG68

ACTN: G-4

1-2

ORDANCE WITH OPNAVINST 3750.6 SERIES

PAGE 3 RUHHFM0713 UNCLAS E F T O

4. IN VIEW OF THE ABOVE THE FOLLOWING IS RECOMMENDED:

A. THAT ALL NON-UT CH-46 ROTOR BLADES WHICH HAVE 100 HOURS OR LESS OPERATING TIME BE RETIRED FROM SERVICE AS SOON AS OPERATIONAL REPLACEMENT ASSETS ARE AVAILABLE.

B. THAT AFTER MAGNETIC PERTURBATION TESTING CAPABILITY IS ESTABLISHED, REMOVE ALL REMAINING NON-UT ROTOR BLADES FROM SERVICE AS SOON AS POSSIBLE, ON A NOT TO INTERFERE WITH REQUIRED FLIGHT OPERATIONS BASIS.

C. THAT SUBSEQUENT TO BEING CLEARED OF MANUFACTURING DEFECTS THROUGH MAGNETIC PERTURBATION TESTING, ALL NON-UT BLADES BE RETURNED TO SERVICE IN SAME CATEGORY AS UT BLADES.

D. THAT PRIORITY ACTION BE CONTINUED TO PROVIDE AN ADEQUATE IMPROVED ELECTRONIC MAGNETIC FIELD TEST EQUIPMENT TO REPLACE INADEQUATE EDDY CURRENT TEST EQUIPMENT NOW IN USE.

E. THAT A PERIODIC INSPECTION INTERVAL BE ESTABLISHED FOR BOTH UT/NON-UT BLADES UTILIZING THE IMPROVED FIELD TEST EQUIPMENT MENTIONED IN PARA 4 D ABOVE.

F. THAT RETROFIT OF ALL H-46 BLADES WITH AN INTEGRAL SPAR INSP SYSTEM BE EXPEDITED.

5. FURTHER, REQUEST PROVIDE ALCON THE LATEST OFFICIAL STATUS

PAGE 4 RUHHFMA0713 UNCLAS E F T O

AND AVAILABILITY OF THE MAGNETIC LEAKAGE FIELD TEST UNITS, MAGNETIC PERTURBATION DEVICE INSTALLATION AT NARF, NORIS AND THE INTEGRAL SPAR INSPECTION SYSTEM FOR CH-46 ROTOR BLADES.

BT

"SPECIAL HANDLING REQUIRED IN

ACCORDANCE WITH OPNAVINST 3750.6 SERIES"

12/31Z/AUG68

2-2

ENZCNA5CB913CZCSLA226

PTTEZYUW RUCILMA1521 1941913-EEEE--RUCILSA.

ZNY EEEEE

ZON2 NRTT NALD TRTT KALD

RUEDUHT T USS GUAM

RUEOGHA T NPRO MORTON

RUMHAW T MARHELTRANSRON ONE SIX ONE

ZOC

P 121913Z JUL 68

FM COMNAVAIRLANT

TO AIG TWO EIGHT NINE

RUEBJMA/MARHELRON ONE

INFO RUEBJMA/MCAS QUANTICO

P 112005Z JUL 68

FM NAVAIRSYSCONHQ

TO COMNAVAIRPAC

COMNAVAIRLANT

INFO CNO

CMC

CHNAVMAT

CGFMFPAC

CGFMFLANT

CGFIRSTMAW

CGSECONDMAW

CGTHIRDMAW

CGNINTHMAB

NAVAIRSYSCOMREPAC

NAVAIRSYSCOMREPLANT

913B/68

Cog: RECORDS

PAGE TWO RUCILMA1521 UNCLAS E F T O

MARHELTRAGRU THREE ZERO

MARHELRON ONE

NAVSAFCE

NPRO MORTON

NARF NORIS

BT

UNCLAS E F T O

CH-46D ACFT ACCIDENT

A. MARNEDHELTRARON THREE ZERO TWO 080436Z JUL 68

B. NAVAIREWORKFAC NORIS 080422Z JUL 68

1. FROM AIR 5104C. REF A RPTD AFT MAIN ROTOR BLADE FAILURE ASSOCIATED WITH CH-46D 153343 ACCIDENT. REF B RPTD PRELIM METALLURGICAL EXAMINATION OF FAILED ROTOR BLADE.

2. FURTHER ANALYSIS OF FAILED ROTOR BLADE BY CONTRACTOR AND NAVAIRSYSCOM CONFIRMS REF B AND SUBSTANTIATES INSPECTION REQUIREMENTS OF IAIB 103 REV B.

3. STRICT COMPLIANCE WITH INSPECTION CRITERIA AND INTERVALS PRESCRIBED IN IAIB 103 REV B REQUIRED. ADDITIONALLY ANY BLADE SHOULD BE INSPECTED THAT SHOWS EVIDENCE OF PHYSICAL DAMAGE.

BT

CH 46D/153343 HMMT-302 1-69A

JULY

OIA48*836LB541

PTTUZYUW RUEBBHB5370 1932131-UUUU--RUCILSA.

ZNR UUUUU

P 112005Z JUL 68

FM NAVAIRSYSCOMHQ

TO RUWJMUA/COMNAVAIRPAC

RUCILMA/COMNAVAIRLANT

INFO RUENAAA/CNO

RUEBHOA/CMC

ZEN/CHNAVMAT

RUHHFMA/CGFMFPAC

RUEBNVA/CGFMFLANT

RUMHAW/CG FIRST MAW

RUEBNLA/CG SECOND MAW

RUWJBRB/CG THIRD MAW

RUABQL/CG NINTH MAB

RUWJMUA/NAVAIRSYSCOMREPAC

RUCILWA/NAVAIRSYSCOMREPLANT

RUWJTPA/MARHELTRAGRU THREE ZERO

RUEBJMA/MARHELRON ONE

RUCILSA/NAVAVNSAFCE

RUEGHA/NPRO MORTON PA

RUWJMUA/NAVAIREWORKFAC NORIS

836B) 68

Copy Records

PAGE TWO RUEBBHB5370 UNCLAS

BT

UNCLAS

CH-46D ACFT ACCIDENT

A. MARMEDHELTRARON THREE ZERO TWO 080436Z JUL 68

B. NAVAIREWORKFAC NORIS 080422Z JUL 68

1. FROM AIR 5104C. REF A RPTD AFT MAIN ROTOR BLADE FAILURE ASSOCIATED WITH CH-46D 153343 ACCIDENT. REF B RPTD PRELIM METALLURGICAL EXAMINATION OF FAILED ROTOR BLADE.

2. FURTHER ANALYSIS OF FAILED ROTOR BLADE BY CONTRACTOR AND NAVAIRSYSCOM CONFIRMS REF B AND SUBSTANTIATES INSPECTION REQUIREMENTS OF IAFB 103 REV B.

3. STRICT COMPLIANCE WITH INSPECTION CRITERIA AND INTERVALS PRESCRIBED IN IAFB 103 REV B REQUIRED. ADDITIONALLY ANY BLADE SHOULD BE INSPECTED THAT SHOWS EVIDENCE OF PHYSICAL DAMAGE.

BT

JUL
112005Z

OIA48*836LB541
PTTUZYUW RUEBBHB5370 1932131-UUUU--RUCILSA.
ZNR UUUUU
P 112005Z JUL 68
FM NAVAIRSYSCOMHQ
TO RUWJMUA/COMNAVAIRPAC
RUCILWA/COMNAVAIRLANT
INFO RUENAAA/CNO
RUEBHOA/CMC
ZEN/CHNAVMA
RUHHFMA/CGFMFPAC
RUEBNVA/CGFMFLANT
RUMHAW/CG FIRST MAW
RUEBNLA/CG SECOND MAW
RUWJBRB/CG THIRD MAW
RUABQL/CG NINTH MAB
RUWJMUA/NAVAIRSYSCOMREPAC
RUCILWA/NAVAIRSYSCOMREPLANT
RUWJTPA/MARHELTRAGRU THREE ZERO
RUEBJMA/MARHELRON ONE
RUCILSA/NAVAVNSAFCE
RUEDGHA/NPRO MORTON PA
RUWJMUA/NAVAIREWORKFAC NORIS

836B) 68

Cog. Records

PAGE TWO RUEBBHB5370 UNCLAS
BT

UNCLAS

CH-46D ACFT ACCIDENT

A. MARMEDHELTRARON THREE ZERO TWO 080436Z JUL 68

B. NAVAIREWORKFAC NORIS 080422Z JUL 68

1. FROM AIR 5104C. REF A RPTD AFT MAIN ROTOR BLADE FAILURE ASSOCIATED WITH CH-46D 153343 ACCIDENT. REF B RPTD PRELIM METALLURGICAL EXAMINATION OF FAILED ROTOR BLADE.

2. FURTHER ANALYSIS OF FAILED ROTOR BLADE BY CONTRACTOR AND NAVAIRSYSCOM CONFIRMS REF B AND SUBSTANTIATES INSPECTION REQUIREMENTS OF IAFB 103 REV B.

3. STRICT COMPLIANCE WITH INSPECTION CRITERIA AND INTERVALS PRESCRIBED IN IAFB 103 REV B REQUIRED. ADDITIONALLY ANY BLADE SHOULD BE INSPECTED THAT SHOWS EVIDENCE OF PHYSICAL DAMAGE.

BT

JUL
112005Z

NNNNMZCNASCA68JCZCSLA253
RTTEZYUW RUWJTPA0195 1920114-EEEE--RUCILSA.
ZNY EEEEE

R 100114Z JUL 68
FM MARMEDHELTRARON THREE ZERO TWO
TO RUCILSA/NAVSAFECEN
P R 040130Z JUL 68
FM MARMEDHELTRARON THREE ZERO TWO
TO CNO

INFO NAVAIRSYSCOM
COMELEVEN
CMC

CG FMFPAC
CG FMFLANT
CG FIRST MAW
CG SECOND MAW
CG THIRD MAW
CG FIRST MARBRIGADE
HEDRON FMFPAC
MARHELTRACRU THREE ZERO
CHNAVMAT
COMNAVAIRLANT
COMNAVAIRPAC

A681-68

Supp AAR

PAGE 2 RUWJTPA UNCLAS E F T O (FOUO)

DIR AFIP
CINCPACFLT

BUPERS
NAVPLANTREPO MORTON

BT
UNCLAS E F T O FOUR OFFICIAL USE ONLY
CMC ATTN: CODE AAP

NAVY SUPPLEMENTARY MESSAGE REPORT OF AIRCRAFT ACCIDENT
A. CPMNAVINST 3750.6F

1. 2JUL 68, 2100T, NIGHT
2. 350 RADIAL 8NM ELTORO TACAN CH36
5. ALFA-FUSELAGE LAYING ON LEFT SIDE RELATIVELY INTACT FWD OF STUB
WING. AFT AREA MELTED BY FIRE. UPPER TAIL PYLON WITH AFT ROTOR HEAD
COMPONENTS RELATIVELY INTACT 50YDS WEST OF MAIN AIRFRAME.

6. BAGWELL, LARRY L., MAJOR, (b) (6), USMC, 7562, ACTIVE, ALFA.
TOTAL HRS 3360. IN TYPE 441, 90DAY 87.

7. (b) (6), (b) (6), ILT, USMC, (b) (6), ACTIVE, BRAVO, CO-PILOT.
ABRAMS, GALE D., CPL, USMC, (b) (6), ACTIVE, ALFA, CREW CHIEF.

BT

100114Z
040130Z

NKNN

ZCZCNASCA660CZCSLB764

RTTUZYUW RUWJMUA 8029 1912129-UUUU--RUCILSA.
ZNR UUUUU

R 092129Z JUL 68

FM NAVAIRSYSCOMREPAC

TO RUWJTPA/MARHEDHELTRARON THREE ZERO TWO

ZENI/NAVAIREWORKFAC NORIS

INFO RUWJTPA/MARHEDTRAGRU THREE ZERO

RUWJTPA/MARHEDMAINTRON THREE ZERO

RUWJBRB/CG THIRD MAW

RUEBBHB/NAVAIRSYSCOMHQ

RUCILSA/NAVAVNSAFCE

ZENI/COMNAVAIRPAC

BT

UNCLAS

CH46D BUNO 153343 ACCIDENT INVEST

A. HMMT-302 070106Z JUL 68 PASEP

B. NAVAIR INST 4700.2 CHG 5

1. FROM CODE 3312. HMMT-302: REQ MARK CONTAINER AND DOCUMENTS FOR PRI DIR AND FWD SELECTED COMPONENTS FROM SUBJ ACFT MENTIONED REF A TO NAVAIREWORKFAC NORIS, CUST SERVICE CODE 523.2 IAW REF B VIA LOCAL SUPPORT ACTY. ADCON SHIPPING MODE AND TCN OF B/L NRS. REFER MY CONTROL NR 2793-68.

PAGE TWO RUWJMUA 8029 UNCLAS

2. NAVAIREWORKFAC NORIS: REQ CONDUCT ENGRG ANAL SELECTED COMPONENTS FROM SUBJ ACFT ACCIDENT IAW REF B AND PREVIOUS FONECON DISCUSSION. ADCON RESULTS ASAP WITH TWO COPIES. THIS CMD. CODE 331. ABOVE CONTROL NR ASGD.

BT

A 660/68

Cog: Records

JUL
092129Z

HSWZ FRL FG QCFCZ CSLA153

RTTUZYUW RUWJUA 8028 1912128-UUUU--RUCILSA.

ZNP UUUUU

R 092128Z JUL 68

FM NAVAIRSYSCOMREPAC

INFO RUEBBHB/NAVAIRSYSCOMHQ

RUCILSA/NAVAVNSAFCE

ZENI/COMNAVAIRPAC

ZENI/NAVAIREVOR KFAC NORIS

R 370106Z JUL 68

FM MARMEDHELTRARON THREE ZERO TWO

TO NAVAIRSYSCOMREPAC

INFO CG THIRD MAW

MARHELTRAGRU THREE ZERO

MARHEDMAINTRON THREE ZERO

BT

UNCLAS

PRIORITY DIR REQUEST

A. NAVAIR INST 4700.2

B. OPNAV INST 3750.6 SERIES

C. TELECON MAJ. (b)(6) AMO, HMMT-302, AND LICOL. (b)(6)

AMO, THIRD MAW

1. HMMT-302/UR 0238/1-69A

2. BLACK STAR CANYON, ORANGE COUNTY, CALIF/022030T JUL 68

3. CH46D/153343/BAGWELL, LARRY L. JAJ, (b)(6)

4. GJ3-8188-38C

5. ALFA/2 ALFA, 1 BRAVO/NONE

6. NONE

7. FURING TWILIGHT MOUNTAIN OPERATIONS ON RIGHT HAND APPROACH TO

PAGE TWO RUWJUA 8028 UNCLAS

2000 FT MSL LZ AFT PYLON SEPARATED, AIRCRAFT PITCHED NOSE UP, AND MAIN FUSELAGE CRASHED VERTICALLY AFT END FIRST. SEGMENTS OF AFT YELLOW ROTOR BLADE DISCOVERED 800 METERS AWAY FROM WRECKAGE ALONG FLIGHT PATH.

8. A. BEL CRANK COLLECTIVE PITCH/NA/14252/77272/AOWC3103-2/NA

(1) NA

(2) NA

(3) 528/NA/NA/NA/NA/NA/

B. BLADE ASSY/A-2-668/15120/77272/A02R1502-2/NOW 66-0209-F

(1) NA

(2) NA

(3) 100/NA/NA/NA/NA/NA/

C. BEARING PLANETARY CARRIER/NA/2651710/32828/A02D5253-1/NA

(1) NA

(2) NA

(3) 258/NA/NA/NA/NA/NA/

9. NA

10. NA

11. PROBABLE MATERIAL FAILURE. EXAMINATION OF SPAR AFT YELLOW ROTOR BLADE REVEALS POSSIBLE FATIGUE FRACTURE.

PAGE THREE RUWJUA 8028 UNCLAS

12. PRIORITY DIR REQUEST

A. PRIORITY

B. DIR AND ENGINEERING ANALYSIS

13. NA

14. NA

15. HMMT-302

16. MAJ (b)(6) HMMT-302/AMO/714 544-2400 EXT 428

17. REF C CG THIRD MAW CONCURRENCE

BT

A 661/68

COB: MAM

JUL 092128Z
092106Z

NNNNZCZKASCA524ZCSLB249
PTIEZYUW RUWJTPA0137 1900436-EEEE--RUCILSA.
ZNY EEEEE

P 080436Z JUL 68

FM MARMEDHELTRARON THREE ZERO TWO

TO RUEPBHB/NAVAIRSYSCOMHC

INFO RUEPBHB/CHNAVMAT

RUCILSA/NAVAIRSAFETYCENTER

RUEOHRA/NAVAIRTECHSERFAC

RUEOGHA/NAVPLANTREPO MORTON

RUWJHUA/NAVAIREWORKFAC NORIS

RUWJHUA/NAVAIRSYSCOMREPAC

RUEBEEA/NAVAIRSYSCOMEICO PAX RIVER

RUWJHUA/COMNAVAIRPAC

RUCILMA/COMNAVAIRLANT

RUEBHOA/CMC

RUHHFMA/CG FMFPAC

RUEBNVA/CG FMFLANT

RUHNAW/CG FIRST MAW

RUEBNLA/CG SECOND MAW

RUWJERA/CG THIRD MAW

RUABQL/CG NINTH MAB

ZEN/MARHELTRACRU THREE ZERO

ZEN/MAR FIVE SIX

ZEN/MARHELMINTRON THREE ZERO

ZEN/MARMEDHELTRON TWO SIX THREE

BT

UNCLAS E F T O

SAFETY UR

A. NAVAIRINST 4700.2

B. MY 030925Z JUL 68 NOTAL

C. MY 240130Z JUL 68 NOTAL

D. MY 070106Z JUL 68 NOTAL

E. OPNAVINST 3750.6F

F. MY 080434Z JUL 68

1. HMMT-302/SAFETY UR NR 0238/1-69A

2. 352 DEGREES RADIAL 8NM EL TORO TACAN CHANNEL 37:022025T JUL 68

3. CH400 153343/BAGWELL, LARRY L. MAJ (b) (6)

4. GJ3-8198-38C

5. ALFA/2 ALFA, 1 BRAVO/NONE

6. NA

7. AFT YELLOW ROTOR BLADE SUFFERED FATIGUE FAILURE APPROX 51 INCHES FROM TIP, CAUSING SEPARATION OF AFT YPLON AND CRASH.

PAGE 3 RUWJTPA0137 UNCLAS E F T O

8. BLADE ASSY/A-2-668/15120/77272/A02R1502-2/KOW 66-0229-F

A. NA

B. NA

C. 102.7/NA/NA/NA/NA/NA

9. IAFB 103 REV B/LAST EDDY CURRENT INSP 22 JUN AT 30.7 HOURS

10. NA

11. PRELIMINARY RESULTS OF FAILURE ANALYSIS AT NAFB NORIS INDICATES MATERIAL FATIGUE FAILURE FROM CURRENTLY UNKNOWN CAUSE, BUT LAP DEFECT DURING BLADE MANUFACTURE IS SUSPECTED. BLADE HAD BEEN PLACED ON 25 HOUR INSPECTION INTERVAL VICE 12.5 HOUR INTERVAL AS REQUIRED BY H46 IAFB 103 REV B, AND HAD RECEIVED AN EDDY CURRENT INSPECTION 22 HOURS PRIOR TO FAILURE. PENDING FINAL RESULTS OF ENGINEERING ANALYSIS REGARDING THE ORIGIN AND PROPAGATION RATE OF SUBJECT CRACK, IT IS RECOMMENDED:

A. THAT IAFB 103 REV B RECEIVE CRITICAL REVIEW AS IT IS CONSIDERED THE PRESENT INSPECTION CRITERIA ESTABLISHES TOO NARROW A SAFETY MARGIN.
B. THAT PENDING COMPLETION OF ABOVE REVIEW AND ENGINEERING ANALYSIS, OPERATIONS BE RESTRICTED TO FLIGHTS OF URGENT OPERATIONAL NECESSITY.
C. THAT FEASIBILITY OF UNRESTRICTED OPERATIONS OF THOSE HELICOPTERS EQUIPPED WITH ALL UT BLADES BE DETERMINED.

PAGE 4 RUWJTPA0137 UNCLAS E F T O

12. REF D

A. NA

B. NA

13. NA

14. NA

15. FAILED PART IN CUSTODY NAFB NORIS

16. MAJ GREY/HMMT-302/AMO/714 544-2400 EXT 400

17. CG 3D MAW CONCERN

A524/62

Gon M4M

50L
4362

NNNNZCZCNASCA525ZCSLB248
 PTTEZYUW RUWJTPA0136 1900434-EEEE--RUCILSA.
 ZNY EEEEE
 P R 080434A JUL 68
 FM MARKEDHELTRARON THREE ZERO TWO
 TO PUENAAA/CNO
 RUCILSA/NAVSAFECEN
 RUWJMUA/NAVAIRSYSCOM
 RUWJMUA/NAVAIRSYSCOMREP PAC
 INFO RUWJMUA/COMNAVAIRPAC
 RUCILKA/COMNAVAIRLANT
 RUWJHEA/COMELEVEN
 RUHHBFA/CINCPACFLT
 RUEBHCA/CMC CODE AAP
 RUHNAW/CG FIRST MAW
 RUEBNLA/CG SECOND MAW
 RUWJBRA/CG THIRD MAW
 RUHHFMA/CG FMFPAC
 RUEBNVA/CG FMFLANT
 RUHHFAA/CG FIRST MARBRIGADE
 RUHHFMA/HEDRON FMFPAC
 ZEN/MARHELTRAGRU THREE ZERO
 RUEBBHB/CHNAVMAT

A525/68

Supp AAR
 102

PAGE 2 RUWJTPA0136 UNCLAS E F T O FOR OFFICIAL USE ONLY

RUEADDA/CIR AFIP
 RUEBJFA/PUPERS
 RUEOGHA/NAVPLANTREPO MORTON
 ZEN/MARAIRGRU FIVE SIX
 BT

UNCLAS E F T O FOR OFFICIAL USE ONLY
 NAVY SUPPLEMENTARY NR 2 MESSAGE RPT OF ACFT ACCIDENT

- A. OPNAVINST 3750.6F
- B. MY 030923Z JUL 68 NOTAL
- C. MY 040130Z JUL 68 NOTAL
- D. MY 070106Z JUL 68 NOTAL
- 1. 2 JUL 68 2025T VICE 2100T, DUSK
- 2. 350 RADIAL 8NM EL TORO TACAN CH37
- 3. CH46D, 153343
- 4. HMMT-302, 1-69A
- 9. NIGHT TRAINING, FLIGHT TIME EST 1 PLUS 55, LOCAL VFR, DEST MCAF SANTA ANA
- 11. DURING APPROACH TO MOUNTAIN LZ, AT A HIGH DEEP 90 DEGREE POSITION 1000 METERS FROM POINT OF INTENDED LANDING A SECTION OF AFT YELLOW ROTOR BLADE 51 INCHES LONG SEPARATED FROM ACFT.

PAGE 3 RUWJTPA0136 UNCLAS E F T O FOR OFFICIAL USE ONLY

SUBSEQUENTLY AFT PYLON AND ROTOR SYSTEM SEPARATED FROM FUSELAGE AND CAME TO REST 400 METERS SHORT OF LZ. MAIN FUSELAGE PITCHED NOSE UP AS PYLON SEPARATED. FUSELAGE IS BELIEVED TO HAVE CONTINUED NOSE PITCH UP TO SLIGHTLY BEYOND VERTICAL POSITION AND CONTACTED GROUND IN APPROXIMATELY A VERTICAL ATTITUDE TAIL FIRST, 300 METERS SHORT OF LZ. FUSELAGE THEN FELL OVER ON LEFT SIDE AND FIRE BROKE OUT IN ENGINE AREA. AFT ONE THIRD OF AIRFRAME EVENTUALLY CONSUMED BY FIRE.

13. FAILED ROTOR BLADE WAS NOT INSP ON 12.5 HOURS CYCLE AS REQUIRED BY INT AFB 103 REV B. SUBJ ROTOR BLADE INSTALLED AS REPLACEMENT BLADE ON ROTOR HEAD WITH OTHER BLADES ON 25 HOUR CYCLE.

14. PRELIMINARY FINDINGS OF PRIORITY DIR/ENGINEERING ANALYSIS REQUESTED IN REF D, INDICATES THAT AFT YELLOW ROTOR BLADE SPAR WUC 15120 P/N A021502-2, S/K A-2-668, MANUFACTURERS CODE 77272 SUFFERED FATIGUE FAILURE 51 INCHES FROM THE TIP AFTER 102.7 HRS TOTAL FLIGHT TIME SINCE NEW. 22.0 HRS HAD ELAPSED SINCE LAST EDDY CURRENT INSPECTION WHICH INDICATED NO DISCREPANCY. ORIGIN OF FATIGUE FAILURE AND PROPAGATION RATE NOT KNOWN PENDING FINAL RESULTS OF ENGINEERING ANALYSIS.

BT

506
 0004342

NNNNISCNASCA52ILB242
PTTEZYUW RUWJMUA0722 1900422-EEEE--RUCILSA.
ZNY EEEEE

P 080422Z JUL 68

FM NAVAIREWORKFAC NORIS
TO ZENI/NAVAIRSYSCOMREPAC
RUEBBHB/COMNAVAIRSYSCOMHC
INFO RUCILWA/NAVAIRSYSCOMREPLANT

ZENI/COMNAVAIRPAC
RUCILMA/COMNAVAIRLANT

RUHHFMA/CGFMFPAC

RUMHAW/FIRST MARAIRWING

RUWJBRB/THIRD MARAIRWING

RUENAAB/CNO

RUCILSA/NAVSAFECEN

RUECCHA/NAVPRO MORTON

RUWJREA/LE FIELL, SANTA FE SPRINGS, CALIF

RUWJTPA/MARMEDELTRARON THREE ZERO TWO

RUEBMLA/SECOND MARAIRWING

BT

UNCLAS E F T O

PPRELIMINARY RIOR BLADE FAILURE ANALYSIS OF CH-46D BUNO 153343 ACCIDENT

1. PPRELIMINARY ANALYSIS OF CH-46D ACCIDENT INDICATED CAUSE DUE TO AN

PAGE TWO RUWJMUA0722 UNCPAS E F T O

AFT MAIN ROTOR BLADE FAILURE. METALLURGICAL EXAMINATION OF THE SUSPECTED
ROTOR BLADE REVEALED A FATIGUE TYPE FAILURE INITIATED BY A MANUFACTURING
DEFECT IN THE FORM OF A NOICH TYPE DEEP SURFACE LAP IN THE BLADE SPAR.

PRESENT BLADE FAILURE IDENTICAL TO THAT EXPERIENCED AND CAUSE OF CH-46
BUNO 1553346 ACCIDENT THAT OCCURRED 30 JUNE 1967.

2. RECOMMEND CONTRACTOR IMMEDIATELY REVIEW ADEQUACY OF PRESENTLY
ESTABLISHED INSPECTION PROCEDURES FOR THE DETECTION OF MATERIAL DEFECTS
IN CH-46 MAIN ROTOR BLADE SPAR.

3. NAVSAFECEN REPRESENTATIVE RECOMMENDS ALL CH/UH-46 HELICOPTERS BE
GROUNDED THAT DO NOT MEET THE REQUIREMENTS OUTLINED IN IAFB 103 REV B.

4. SUPPLEMENTARY FAILURE ANALYSIS MESSAGE WILL FOLLOW.

BT

A521/62

PRELIM AAR

ID 670630/04
on this per
the per
factory

Sub
080422

NNNNTSCNASCAS521LB242
PTTEZYUW RUWJMUA0722 1900422-EEEE--RUCILSA.
ZNY EEEEE
P 080422Z JUL 68
FM NAVAIREWCRKFAC NORIS
TO ZENI/NAVAIRSYSCOMREPAC
RUEBBHB/COMNAVAIRSYSCOMHC
INFO RUCILWA/NAVAIRSYSCOMREPLANT
ZENI/COMNAVAIRPAC
RUCILMA/COMNAVAIRLANT
RUHHFMA/CGFMFPAC
RUMHAW/FIRST MARAIRWING
RUWJBRB/THIRD MARAIRWING
RUENAAA/CNO
RUCILSA/NAVSAFECEN
RUECCHA/NAVPRO MORTON
RUWJREA/LE FIELL, SANTA FE SPRINGS, CALIF
RUWJIPA/MARDEHELTRARON THREE ZERO TWO
RUEBNLA/SECOND MARAIRWING
BT

UNCLAS E F T O

PELIMINARY ROTOR BLADE FAILURE ANALYSIS OF CH-46D BUONO 153343 ACCIDENT
1. PELIMINARY ANALYSIS OF CH-46D ACCIDENT INDICATED CAUSE DUE TO AN

PAGE TWO RUWJMUA0722 UNCPAS E F T O

AFT MAIN ROTOR BLADE FAILURE. METALLURGICAL EXAMINATION OF THE SUSPECTED
ROTOR BLADE REVEALED A FATIGUE TYPE FAILURE INITIATED BY A MANUFACTURING
DEFECT IN THE FORM OF A NOTCH TYPE DEEP SURFACE LAP IN THE BLADE SPAR.
PRESENT BLADE FAILURE IDENTICAL TO THAT EXPERIENCED AND CAUSE OF CH-46
BUONO 153346 ACCIDENT THAT OCCURRED 30 JUNE 1967.

2. RECOMMEND CONTRACTOR IMMEDIATELY REVIEW ADEQUACY OF PRESENTLY
ESTABLISHED INSPECTION PROCEDURES FOR THE DETECTION OF MATERIAL DEFECTS
IN CH-46 MAIN ROTOR BLADE SPAR.

3. NAVSAFECEN REPRESENTATIVE RECOMMENDS ALL CH/UH-46 HELICOPTERS BE
GROUNDED THAT DO NOT MEET THE REQUIREMENTS OUTLINED IN IAFB 103 REV B.

4. SUPPLEMENTARY FAILURE ANALYSIS MESSAGE WILL FOLLOW.

BT

CH-46D / 153343

HMMT 302

MCAS EL TORO
UNK

501
080422

AS21/68
PRELIM AAR

NNNNHSWZFR LFG UCJCZCSLB232
PTTEZYVW RUWJTPA0133 1900009-EEEE--RUCILSA.
ZNY EEEEE

BT
UNCLAS E F T O SVC
H/W ZDK RUWJTPA0088 1860130 P R C40130Z JULY 68. RUCILSA TAKE FOR FIRST
TIME ALL OTHERS CORR FROM TO TO INFO.

P P 040130Z JULY 68
FM MARMEDHELIRARON THREE ZERO TWO

TO RUE NAAA/CNO
RUCILSA/NAVSAFCE N
INFO RUEBBHB/NAVAIRSYSCOM
RUWJHEA/COM ELEVEN
RUEBHOW/CMC

RUHHFMA/CG FMFPAC
RUEBNVA/CG FMFLANT
RUHAW/CG FIRST MAW
RUEBNLA/CG SECOND MAW
RUWJBRA/CG THIRD MAW
RUHHFAA/CG FIRST MABRIGADE
RUHHFMA/HEDRON FMFPAC
ZEN/MARHELTRACRU THREE ZERO
RUEBBHB/CHNAVMAT
RUCILMA/COMNAVAIRLANT
RUEADDA/DIR AFIP
RUHKBRA/CINCPACFLT
RUEBJFA/BUPERS

PAGE 2 RUWJTPA0088 UNCLAS E F T O (FOUO)

RUEOGHA/NAVPLANTREPO MORTON
RUWJMUA/COMNAVAIRPAC
BT

UNCLAS E F T O (FOR OFFICIAL USE ONLY)

CMC ATTN: CODE AAP
NAVY SUPPLEMENTARY MESSAGE REPORT OF AIRCRAFT ACCIDENT

A. OPNAVINST 3750.6F

1. 2JUL68, 2100T, NIGHT

2. 350 RADIAL 8NM ELTORO TACAN CH37

5. ALFA-FUSELAGE LAYING ON LEFT SIDE RELATIVELY INTACT FWD OF STUB
WING. AFT AREA MELTED BY FIRE. UPPER TAIL PYLON WITH AFT TOROT HEAD COMPONEN

RELATIVELY INTACT 50YDS WEST OF MAIN AIRFRAME.

6. BAGWELL, LARRY L., MAJOR, (b) (6) USMC, 7562, ACTIVE, ALFA.

TOTAL HRS 3360, IN TYPE 441, S0DAY 87.

7. (b) (6) ILT, USMC, (b) (6) ACTIVE, BRAVO, CO-PILOT.

ABRAMS, GALE S., CPL, USMC, (b) (6) ACTIVE, ALFA, CREW CHIEF.

BT

CH-460/153343

HMMF-302

1-69A

7-2-68

AS16/68

SUPP/AAR

JUL
040130Z

NNNN01W40'514CZCSLB230
PTTEZYVW RUWJTPA00134 1900030-EEEE--RUCILSA.
ZNY EEEEE

BT

UNCLAS E F T O SVC

H/W ZDK RUWJTPA00054 1850923 P R 030923Z JUL 68. RUCILSA TAKE FOR
FIRST TIME, ALL OTHERS CORR FROM TO TO INFO.

P R 030923Z JUL 68

FM MARMEDHELTRARON THREE ZERO TWO
TO RUENAAA/CNO

RUCILSA/NAVSACFEN

INFO RUEBBHB/NAVAIRSYSCOM

RUWJHEA/COMLEVEN

RUWJMUA/COMNAVAIRPAC

RUEBHOA/CMC

RUHHFMA/CG FMFPAC

RUEBNVA/CG FMFLANT

RUMHAW/CG FIRST MAW

RUEBNLA/CG SECOND MAW

RUWJBRA/CG THIRD MAW

RUHHFAA/CG FIRST MARBRIGADE

RUHHFMA/HEDRON FMFPAC

ZEN/MARHELTRAGRU THREE ZERO

RUEBBHB/CHNAVMAT

RUCILMA/COMNAVAIRLANT

RUEADDA/DIR AFIP

RUHHBRA/CINCPACFLT

PAGE 2 RUWJTPA00054 UNCLAS E F T O (FOUO)

RUEBJFA/BUPERS

RUEOGHA/NAVPLANTRPO MORTON

BT

UNCLAS E F T O (FOR OFFICIAL USE ONLY)

CMC CODE AAP

NAVY PRELIMINARY MESSAGE OF AIRCRAFT ACCIDENT

A. OPNAVINST 3750.6F

1. 2JUL68, 2100T, NIGHT

2. 350 RADIAL 8NM ELTORO TACAN CH37

3. CH-46D, 153343

4. HMMT-302, 1-69A

5. ALFA, BURNED AFTER IMPACT

6. NAME WITHHELD PENDING NOTIFICATION NOK

7. 2 CM, NAMES WITHHELD PENINIG NOTIFICATION NOK

8. NONE

9. NIGHT TRAINING, FLIGHT TIME EST 1 PLUS 00, LOCAL VFR, DEST
MCAF SANTA ANA

10. NIGHT LANDING

11. INFO RELAYED FROM NAVY FLIGHT SURGEON. CO-PILOT STATED AIRCRAFT
WAS MAKING A NORMAL APPROACH TO ROUGH AREA LANDING SITE WITH CO-PILOT AT
CONTROLS. APPROX. 300 FT AGL (2000 MSL) NOSE OF AIRCRAFT BEGAN TO PITCH B

PAGE 3 RUWJTPA00054 UNCLAS E F T O (FOUO)

PILOT TOOK CONTROL AS AIRCRAFT STARTED TO GO INVERTED. NO FURTHER INFO W/
L 1
FROM SURVIVING PILOT AT THIS TIME.

12. CLEAR 10 MI VIS, WIND EST 220, 4 KTS, TEMP 65 F, DEWPT 61 F

13. UNKNOWN

14. UNKNOWN

15. NO INJURIES, PROPERTY DAMAGE UNKNOWN

16. WRECKAGE FULLY ACCESSIBLE BY ROAD AND AIR

17. (b) (6) MAJOR, OPS OFFICER. AUTOVON 898-1850 EXT 411

Make

B514/68

PRELIM AAR

80702102

Jul